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COMPUTERWORLD

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Fujitsu given key to IBM's software vault

BY CLINTON WILDER
CW STAFF

NEW YORK — In an extraordinary resolution of the five-year struggle over rights to IBM's MVS operating system, federal arbitrators last week granted Fujitsu Ltd. unprecedented access to IBM systems software source code.

Although Fujitsu will pay a substantial, but still undetermined, fee for that access, the arbitration settlement breaks new ground by ordering IBM to make the source code available for a period lasting between five and 10 years in a tightly monitored "secured facility." The arbitrators also absolved Fujitsu of any alleged theft of trade secrets from IBM, removing a major cloud from Fujitsu's marketing efforts overseas.

In theory, the settlement would seem to break IBM's stranglehold on mainframe operating systems by allowing Fujitsu to develop and market alternative systems derived from access to IBM technology. While Fujitsu may not realize significant market share gains in IBM systems software, its mere presence in the market should rein in IBM's price increases and other actions the company has been able to take as a sole supplier.

Lid on price hikes?

"IBM mainframe customers won't flock to Fujitsu [operating systems]," said Stephen Smith, an analyst at Paine Webber, Inc. "But, IBM has been raising prices, and my view is that this puts something of a lid on that."

Users interviewed last week agreed that it is unlikely that IBM mainframe customers will opt to purchase IBM-compatible Fujitsu systems software in the near future, despite the stated intent of the arbitrators (see story page 149).

"The order will foster competition with respect to IBM-compatible mainframe operating system software," wrote American Arbitration Association arbitrators John L. Jones and Robert H. Mnookin in their opinion.

"If I were IBM, I'd be very disappointed with this," Smith said. "Fujitsu was basically vindicated."

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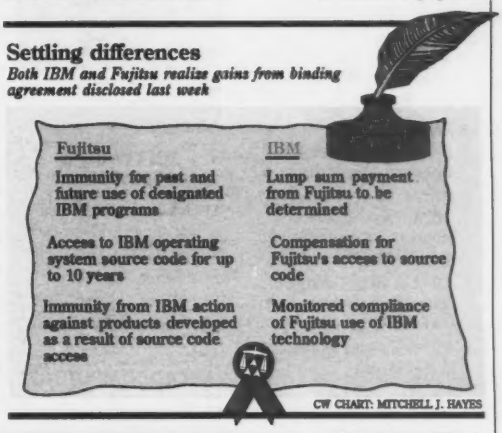
Settling differences

Both IBM and Fujitsu realize gains from binding agreement disclosed last week



CW CHART: MITCHELL J. HAYES

ADR opts for query standard

BY ALAN ALPER
CW STAFF

NEW YORK — Applied Data Research, Inc. last week endorsed the IBM-sanctioned SQL language but chose a version of SQL that is incompatible with IBM's.

In its most significant data base move since being acquired by Ameritech 18 months ago, ADR said it will support the ANSI-standard SQL in Datacom/DB and Ideal, its flagship data base products.

At the same time, the company announced a personal computer-based computer-aided software engineering package

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SQL to get short shrift in Dbase IV

Update expected to offer language subset, limited access to host data bases

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate will not include a full version of IBM's SQL in its next-generation Dbase package, according to third parties and former Ashton-Tate employees. The lack of a full SQL will limit the product's ability to communicate with host data bases.

While a more complete implementation of SQL is expected in Ashton-Tate's future products for Microsoft Corp.'s MS OS/2 operating system, the next Microsoft MS-DOS version of Dbase, commonly called Dbase IV, will include only a subset of SQL, these sources said. Ashton-Tate has not formally announced Dbase IV. Company officials were unavailable for comment last week.

Ashton-Tate previously disclosed plans to provide embedded SQL, under which SQL statements can be executed from within programs, in future versions of Dbase. But according to numerous knowledgeable sources, Dbase IV will only translate a subset of SQL statements into the Dbase language and will not allow Dbase commands to be translated into SQL. As a result, Dbase IV cannot be effectively used to query host-based SQL data bases, such as IBM's DB2. Users can, however, use SQL to query Dbase IV data and generate applications.

While many microcomputer users said they care little about SQL, support for the language is considered critical to Ashton-Tate's long-term success. SQL is an emerging standard that has been endorsed by virtually all the major relational data base vendors and will be a major component of IBM's Systems Applica-

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'Never mind!' Businesses cool off on site license issue

BY ED SCANNELL
CW STAFF

The cries of large corporations for site licensing agreements from microcomputer software companies have died down to a whisper. The once-bright prospect of making unlimited copies of software programs for a one-time fee has been dulled by the everyday realities of administering and supporting these agreements.

As a result, it is unlikely that the so-called Big Three software companies — Lotus Development Corp., Ashton-Tate and Microsoft Corp. — will announced site licensing programs in the near future, observers say. Although the arrival of more expensive Microsoft MS OS/2-based applications next year will prompt some vendors to revamp their licensing policies, many corporate buyers have realized that the licenses require a lot of effort for limited return.

"It doesn't work," says Ron Goldfarb, manager of office automation for Pratt & Whitney Administration. "It turns out that no one is really sure how many copies of a given program they need. It seems like the paperwork on a site license is more

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Vaporware. Codex announces its 9800 Series Integrated Network Management System, based on ISO standards, but says users will have to wait until end of 1988 for most of the pieces. Page 8.

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"It seems like the paperwork on a site license is more time-consuming than the benefits you get."

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Loosened restrictions spell growth for Bells

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The regional Bell holding companies are likely to use the tiny amount of freedom granted by U.S. District Judge Harold H. Greene to form joint ventures with information service companies or to acquire nontelecommunications firms, analysts said last week.

In his Sept. 10 ruling, Greene gave the Bell companies permission to provide transmission gateways for videotex, electronic mail, on-line data retrieval and other information services. In addition, Greene abolished all restrictions on investments in businesses outside the communications industry.

Mark Winther, market analyst for Link Resources Corp. in New York, predicted there will be more joint ventures like the one between Ameritech and Inet Company of America, a Chantilly, Va.-based firm that is providing a network gateway for on-line data bases and electronic mail [CW, Aug. 31].

Investment options

While some Bell companies will invest in enhancing their local networks with new features, others will concentrate on plain telephone services and invest their profits in financial services, computer software and other businesses, according to Jerome G. Lucas, president of Telestrategies, Inc., a consulting firm in McLean, Va.

"Judge Greene made it very easy for them to diversify into nontelecommunications activities," Lucas said. Greene abolished the entire prohibition on nontelecommunications businesses, including the requirements to obtain waivers on a case-by-case basis and limit outside business revenue to 10% of total revenue.

Wall Street sources suggested that the seven regional Bell companies, with easy access to capital, will seek acquisitions in the range of $200 million to $300 million. For example, Ameritech, a holding company based in Chicago, bought the computer software vendor Applied Data Research, Inc. for about $215 million early last year.

Because Greene blocked the Bell companies from getting into long-distance or equipment manufacturing businesses [CW, Sept. 14], there will be even more incentive to diversify into new businesses, analysts said.

In a 223-page antitrust opinion reviewing the Modified Final Judgment that broke up the old Bell System three years ago, Greene said that most of the restrictions on the Bell holding companies must be retained because the divested Bell operating companies could still use their monopoly power over the local networks to harm competitors.

The Bell companies were particularly disappointed by Greene's decision to allow them access to only a small part of the information services industry.

Greene's ruling permits the Bell companies to transport information services but not to provide or modify the information content. Specifically, he said the companies can provide only data transmission, address translation, protocol conversion, billing management and two introductory pages for an electronic information service.

By preventing the Bell companies from providing information services such as electronic Yellow Pages, Greene's decision denies them access to 80% of the $2-billion information services market, said George R. Dellinger, telecommunications analyst for Washington Analysis Corp.

"That's why they're kicking and screaming, moaning and whining," Dellinger said.

Clearing up fuzziness

Greene, acknowledging that there may be some fuzzy distinctions between transporting and providing information services, started a supplemental proceeding that allows interested parties to offer suggestions on how to draw the line. That proceeding is expected to last a few months and result in an order that more clearly defines what the Bell companies can do in the information services market.

"There is a tremendous lack of clarity about what they can and cannot do, especially in the voice messaging, electronic mail and electronic data interchange fields," observed Steven Sieck, vice-president of electronic services for Link Resources.

The Information Industry Association supported Greene's decision, although the trade association is expected to seek safeguards against any anticompetitive behavior by the Bell companies.

Analysts predicted the Bell companies will appeal Greene's ruling to the federal appeals court but said they doubted the decision will be overturned there.

On another front, some members of Congress have expressed interest in pushing legislation to provide the Bell companies with more freedom or at least in turning the regulatory decisions over to the Federal Communications Commission.

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Soft-Switch assembles E-mail backbone

BY STANLEY GIBSON
CW STAFF

BOSTON — Moving to take a leadership role in corporate network building, Soft-Switch, Inc. last week unveiled an electronic mail backbone product that brings IBM's Systems Network Architecture Distribution System (SNADS) to the VM operating system for the first time.

Running the new Soft-Switch Central/VM software package, a VM host — most likely the IBM 9370 — will switch E-mail and editable documents from multiple vendors through Soft-Switch gateways.

"Large accounts need a backbone environment. The 9370 is clearly going to be IBM's communications gateway box," declared Michael Zisman, Soft-Switch chairman and chief executive officer.

IBM currently does not offer its SNADS protocol under VM but offers it as part of its Distributed Office Support System (Disoss), which runs under MVS. In addition, SNADS is included in IBM's Personal Services/36 for the System/36 and Personal Services/38 for the System/38. Professional Office System (Profs) is IBM's E-mail protocol supported under VM.

Ties separate mail packs

Soft-Switch also announced products that will bring Hewlett-Packard Co.'s Desk, Novell, Inc.'s The Coordinator, 3Com Corp.'s 3+ Mail and Profs to the VM-based SNADS network.

Soft-Switch will use its own existing products to link Digital Equipment Corp.'s All-In-1, Wang Laboratories, Inc.'s Wang Office and NBI, Inc. and Xerox Corp. mail systems into Soft-Switch Central/VM.

Soft-Switch announced it will be a value-added reseller for Lotus Development Corp.'s Lotus Express, a package of communications software for MCI Communications Corp.'s MCI Mail.

In addition, Soft-Switch announced the creation of its Engineering Services Group, which it said will design customized networks for major customers.

Zisman also said that in the fourth quarter, his firm will offer a bridge that will link HP Desk with All-In-1.

"The announcement is very positive for them. One of the main complaints about the way you had to arrange a multivendor environment in IBM world is that you had to do it on a host," said David Terrie, president of Newport Consulting in Boston. "IBM has said it will be distributing things, but Soft-Switch is getting a jump on them."

Terrie said the system could by improved to enable automatic updating of directories of the various systems working in a Soft-Switch network.

Currently, updating is done on each system by a network administrator, he said, adding that a distributed naming system announced by DEC at the recent Decworld '87 show is more advanced and that IBM is trailing in this area.

Competition from DEC

The Soft-Switch rollout came one week after DEC unveiled its Mailbus, the facility linking All-In-1, SNADS and Disoss and CCITT X.400-based E-mail systems.

Zisman acknowledged that Mailbus will offer stiff competition. "It's an alternative to a SNADS backbone," he said.

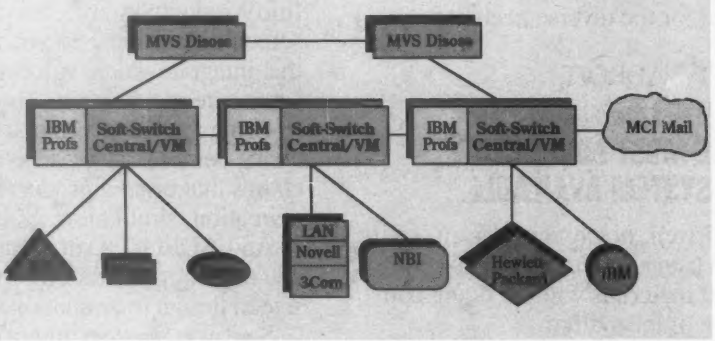
Conspicuous by its absence in Soft-Switch's plans was Data General Corp.'s Comprehensive Electronic Office system. "We don't run into DG very often in the large-account marketplace," Zisman explained.

Zisman said Soft-Switch is committed to supporting X.400 but that the international E-mail standard is not yet a strong factor in the U.S. "The market is not driven by X.400 in the U.S.," he said. However, he added, the strong presence of SNA within major companies dictates the increasing use of SNADS, and as time goes on, X.400 may be used between companies.

Soft-Switch Central/VM and all the gateway products are available immediately. Prices for the products announced last week range from about $40,000 to $400,000, according to the number of nodes on which a specific software package will run. The high-end price is a ceiling for interconnecting DEC, Wang, IBM and HP systems with an unlimited number of nodes within a corporation, according to Soft-Switch.

Marriage broker

Soft-Switch intends to use IBM's 9370 and VM software as the hub components of multivendor networks



INFORMATION PROVIDED BY SOFT-SWITCH, INC.
CW CHART

Intergraph plans to buy Clipper chip

Wants to secure supply of 32-bit microprocessor after earlier shortages

HUNTSVILLE, Ala. — Intergraph Corp. announced plans last week to acquire the Fairchild Camera & Instrument Corp. Clipper microprocessor, which it has been using in its line of engineering workstations.

The purchase is subject to the pending acquisition of Fairchild's semiconductor business by National Semiconductor Corp. Financial terms were not disclosed by Intergraph.

Intergraph, located here, is a maker of computer-aided design and manufacturing systems.

The Clipper chip is a 32-bit reduced instruction set computing-based microprocessor that reportedly processes data at a rate of 5 million instructions per second.

Fairchild has been selling Clipper to Intergraph and a handful of other companies, most of which Fairchild has not named.

"As of now, we haven't indicated that we will cancel anyone's supply, but I can't tell you what our future plans are," said James Dorton, assistant treasurer at Intergraph.

No direct competitors of Intergraph use the Clipper chip, Dorton added.

Keeping up with demand

Dorton said Intergraph viewed the Clipper purchase as a good business decision and one that would "secure the supply" of the chip.

In late 1986 and early this year, Fairchild had difficulty keeping up with demand for Clipper, and its customers — particularly Intergraph — were unable to meet their own shipment schedules as a result.

Dorton said that Fairchild had rectified the situation by June and that the early delays were not the primary reason for purchasing the microprocessor.

The agreement primarily concerns Clipper technology and does not include any wafer-fabrication facilities that Fairchild had used.

Currently, most of the Clipper chips are built by Fujitsu Ltd. in Japan on a subcontracting basis. Dorton said the arrangement will stay intact for the near future.

Chrysler drives into leasing

Consolidation in the computer leasing business continued with two recent acquisitions.

Greenwich, Conn.-based Chrysler Asset Management Corp. entered the field with the acquisition of NFC Leasing, Inc., a Hinsdale, Ill.-based lessor of mainframes and peripherals. The purchase price was not disclosed. NFC Leasing had revenue of $59.8 million and an asset portfolio of $47.5 million for its fiscal year ended March 31.

In another recent deal, Redondo Beach, Calif.-based computer lessor Capital Associates, Inc. acquired Leastec Corp. of Walnut Creek, Calif., for an undisclosed amount. Leastec reported a portfolio of $37 million for the year ended Aug. 31.

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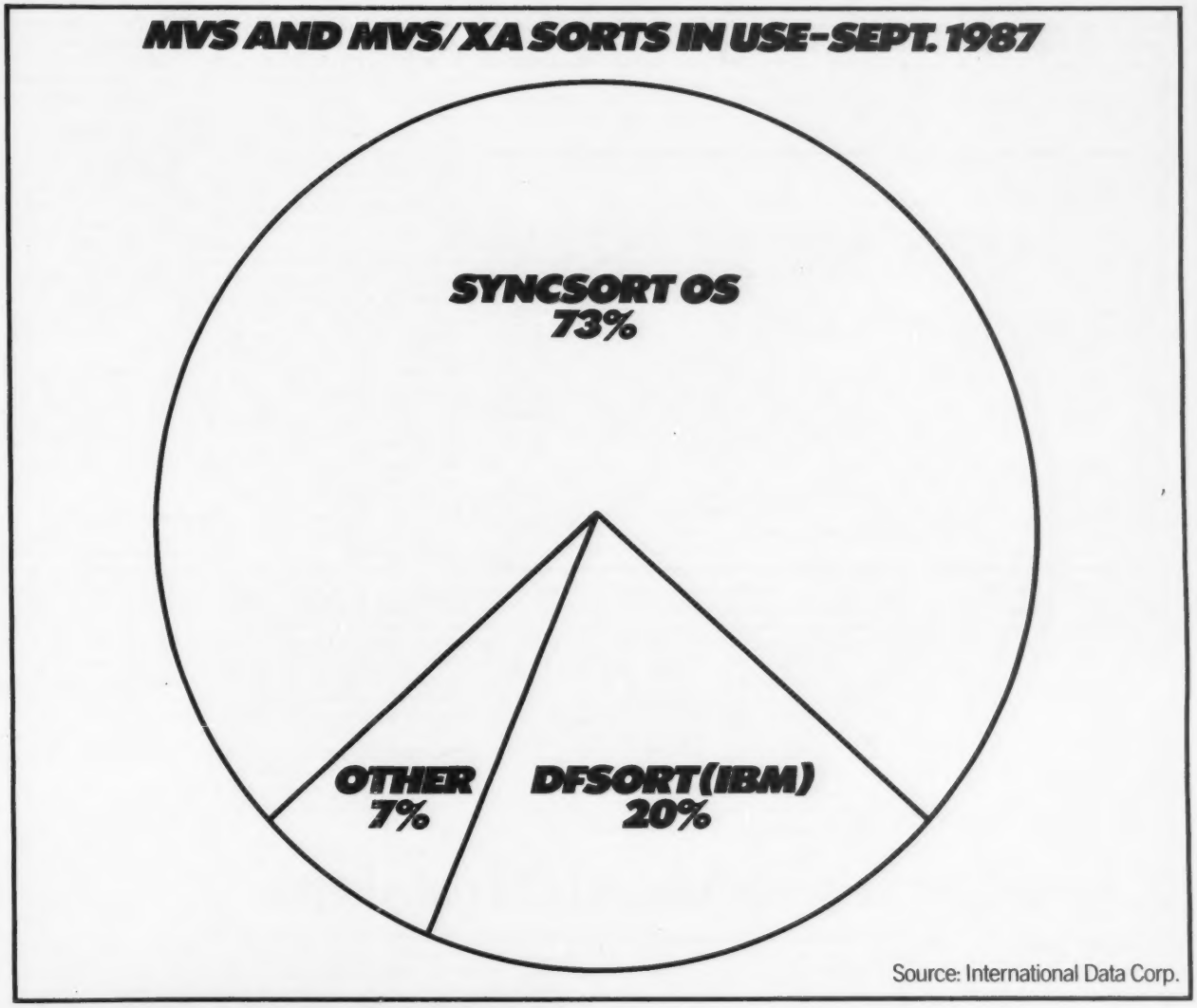

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HP adds five units to Vectra PC line

Responses to PS/2 accommodate programs on 5¼-, 3½-in. disks

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Hewlett-Packard Co. today will parallel IBM's Personal System/2 family by extending its Vectra personal computer line with five units based on Intel Corp. 8086, 80286 and 80386 processors.

Unlike the PS/2 machines, however, the new Vectras reportedly accommodate programs residing on 5¼- and 3½-in. diskettes simultaneously.

based models, the 8-MHz Vectra ES and 12-MHz Vectra ES/12.

The announcement of the five Vectra family additions coincides with the release of an enhanced version of Microsoft Corp.'s Windows. Scheduled to be available on the workstations by year's end, the upgrade will support memory management utilities and other features that previously existed only on HP's proprietary version of Windows, according to HP marketing manager Jim Carlson.

ers for local networks.

All five extensions to the Vectra PC line support Microsoft's MS-DOS 3.2 and, except for the entry-level Vectra CS, will also run OS/2, the operating system being jointly developed by IBM and Microsoft.

Like their PS/2 equivalents, the latest Vectra family members support 3½-in. diskettes, but they also come standard with 5¼-in. drives.

Users have a choice of configuring their Vectras with any

Vectra grows up

HP's five additions to Vectra PC family range from entry-level to high-performance

Model	Microprocessor type	Performance rating (in MHz)	Main memory (in bytes)	Diskette options	Hard-disk options	Price range
Vectra CS	8086	7.16	640K to 8M	5¼-in. 360K-byte, 3½-in. 1.44M-byte	20M-byte	$1,195-$1,895 (640K bytes)
Vectra ES	80286	8	640K to 8M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	20M-byte	$2,595-$2,795 (640K bytes)
Vectra ES/12	80286	12	640K to 8M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	20M-byte	$2,995-$4,195 (640K bytes)
Vectra RS/16 (floor-standing)	80386	16	1M to 16M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	40M-byte	$6,495 (1M byte)
Vectra RS/20 (floor-standing)	80386	20	2M to 16M	5¼-in. 360K-byte, 5¼-in. 1.2M-byte, 3½-in. 1.44M-byte	40M-byte, 103M-byte, 155M-byte, 310M-byte	$7,495 (1M byte) $11,995 (2M bytes)

INFORMATION PROVIDED BY HEWLETT-PACKARD CO.
CW CHART

HP said it plans to formally introduce the machines today at an HP users group meeting. The systems range from the desktop Vectra CS, with a 7-MHz 8086, to the Vectra RS/16 and RS/20, which incorporate 16- and 20-MHz 80386s, respectively. The latter units are the first offered by HP in a floor-standing configuration, which is commonly used in file server applications.

HP will also replace its existing Vectras with two 80286-

As part of today's introduction, HP is also slated to introduce bundled packages. One, designed for desktop publishing, combines the Vectras with Windows, Aldus Corp.'s Pagemaker and an HP laser printer, Carlson said. It will be priced from $4,389 to $6,479.

The other packaged system, priced from $3,135 to $5,125, marries the workstations to a built-in Starlan board to turn them into communications servcombination of 5¼- and 3½-in. diskette drives.

"HP's decision to allow its workstations to talk to both the old and new kinds of disks is a very good idea," said Steve Susa, manager of technical systems for Interex Corp., the company's international users group.

Conform to EMS

Except for the Vectra CS, all five of HP's latest workstations conform to Version 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). The support enables Vectra users to expand their micros to as much as 16M bytes of memory, said Thomas Buiocchi, a product manager with the firm's Personal Office Computer Division.

The Vectra CS conforms to the Lotus/Intel/Microsoft EMS Version 3.2 specification, which allows the product to hold up to 8M bytes of main memory.

DEC emulation

All five Vectra models come with an AT&T-style keyboard, provide HP and Digital Equipment Corp. terminal emulation as standard features and support disk caching, which can boost performance by as much as 100%, Buiocchi said.

The products also use a surface-mounting technique of attaching chips to their motherboards — an approach that cuts heat dissipation by 20% and minimizes parts counts, he added.

Intended mainly as a local network server and personal engineering workstation, the floor-standing Vectra RS/20 incorporates up to two 103M-, 155M- or 310M-byte hard-disk units with a 17-msec average seek time. A version with 1M byte of memory, a 1.2M-byte floppy disk drive and a 40M-byte hard disk costs $7,495. A comparably configured Vectra RS/16, which is also packaged as a tower but has a 16-MHz processor, costs $6,495.

A minimum-configuration Vectra CS with an 8086 chip, 640K bytes of random-access memory and a 360K-byte floppy disk drive sells for $1,195. The 80286-based Vectra ES and ES/12 with 1.2M-byte floppy disk drives and 640K bytes of main memory start at $2,595 and $2,995, respectively.

HP said initial availability for the five Vectra machines will begin around Oct. 1 and extend through the first quarter of next year.

HP launches 24-wire dot printer

BY JAMES CONNOLLY
CW STAFF

VANCOUVER, Wash. — Hewlett-Packard Co. is expected to commit to 24-wire dot matrix printer technology today with the introduction of a $1,695 printer designed to support multiple personal computers or minicomputers.

With a draft-quality print speed of 480 char./sec. and a letter-quality speed of 240 char./sec., the Ruggedwriter 480 is targeted at applications ranging from PC spreadsheets and graphs to high-speed data processing center print jobs.

The printer was designed to be more reliable than and twice as fast as HP's previous mid-range printers, the 12-wire HP 2932 and 2934.

Carol J. Peterman, impact product line manager for HP, positioned the Ruggedwriter 480 with the HP Laserjet in a performance range covering individual printing and work group printing.

Reliability claimed high

The printer, which uses an HP-designed printhead, is expected to have a 20,000-hour mean time between failures, HP said. Peterman said this reliability rate is four times that of other dot matrix printers in its class. HP claimed print speed and reliability advantages in comparison with the Epson America, Inc. LQ-2500, the NEC America, Inc. P5 and P9, the Okidata 393 and the Toshiba America, Inc. 351.

However, a research analyst for Newtonville, Mass.-based market research firm Datek Information Service, Inc. said HP was comparing its printer to products more commonly used in less demanding, single-user applications than in work group situations.

Analyst Scott Puopolo said more appropriate comparisons would be with the NEC P8300 or the Mannesman Tally Corp. 330, both of which are heavy-duty DP-oriented 24-wire printers. He said that even in the latter comparisons, HP appears to hold a price advantage.

Puopolo said HP "has hit on a good combination" in its Ruggedwriter 480 design. He praised the paper-handling features, including the Laserjet's optional sheet feeder.

The list price is $1,695. An 18K-byte font-cartridge accessory costs $150, and the automatic sheet feeder costs $250.

Deliveries are scheduled to start Oct. 1.

COS packages help vendors test OSI compliance

BY MITCH BETTS
CW STAFF

MCLEAN, Va. — The Corporation for Open Systems (COS) last week announced four more software packages that were designed to test whether vendors' products conform to Open Systems Interconnect (OSI) protocols.

The new software packages will test compliance with the Internet, FTAM, Message Handling System (MHS) and token-bus (IEEE 802.4) protocols, according to COS officials speaking at a press conference.

COS, a nonprofit consortium working to accelerate the use of OSI standards, developed the test suites to help vendors design systems that meet standard OSI specifications for interoperability.

Conformance testing

COS will also use the software packages in its testing center to certify that products conform to the standards.

Lincoln D. Faurer, president of COS, said the products are being unveiled in order to help COS members participate in an interoperability demonstration that is called the Enterprise Networking Event '88 International and is slated to be held in Baltimore in June 1988.

COS began shipping its first product, the Transport Protocol Conformance Test System, earlier this month [CW, Sept. 14]. That product costs $20,000 to $35,000 for COS members and $40,000 for nonmembers.

The four additional products are the following:

- The 802.4 (token-bus technology) Test System will reportedly be available at the end of October, with prices starting at $6,000.
- The Internet Protocol Test System will begin shipping in late November; it costs $5,000 to $14,000 for COS members and $16,000 for nonmembers.
- The FTAM Protocol Test System will begin shipping in late November; it costs $30,000 to $85,000 for COS members and $100,000 for nonmembers.
- The MHS Protocol Test System will begin shipping in late December; it costs $25,000 to $115,000 for COS members and $135,000 for nonmembers.

Under the Sun

The COS software products run on a Sun Microsystems, Inc. Sun-3/160 workstation.

Officials said the products will be sold this fall to COS members attending the Baltimore event and will be released for sale to other vendors in February, March and April next year.

Faurer said COS will not begin conformance testing until shortly after the June 1988 event in Baltimore because the organization's small staff will be unable to devote its attention to in-house testing until after the event.

Windows opens to relational

BY DOUGLAS BARNEY
CW STAFF

FOSTER CITY, Calif. — One of the first relational data base packages to run under Microsoft Corp.'s Windows 2.0 operating environment will be announced this week by Blyth Software, Inc., sources at the firm confirmed.

The announcement will occur at Microsoft's Redwood City, Calif., introduction of Windows 386, a version of Windows that acts as a control program for Intel Corp. 80386-based microcomputers.

Compaq Computer Corp. has been expected to announce an agreement under which a special version of Windows 386 will be bundled with the Compaq Deskpro 386. It was unclear at press time whether Compaq would announce such an agreement.

The $795 Blyth package, Omnis Quartz, is a rework of the firm's popular data base for Apple Computer, Inc.'s Macintosh. Microsoft Windows 2.0 is scheduled to ship by next month. A runtime version of Windows 2.0 will be bundled with Blyth's Omnis Quartz, the vendor said.

Interface lauded

While Windows requires a large investment in hardware, including an Intel 80286-based machine, a mouse and high-resolution graphics, packages like Omnis Quartz reward the user with ease of use and more elegant screens. "You have got to love the interface," said Rick Sherlund, a software analyst for Goldman, Sachs & Co.

But the Windows requirement may hinder the market for Blyth. "I have never met a Windows user," said Adam Green, a Lexington, Mass.-based data base consultant.

The move to Windows is also expected to ease the porting of Omnis Quartz to Microsoft's OS/2 Version 1.1, which is expected to be released sometime next year.

The Blyth package provides what-you-see-is-what-you-get capability, which enables users to view a report on the screen the way it will be printed. It also makes use of pull-down menus and provides layered windows for entering and viewing data.

The package reportedly can work with data sets of up to 2.5G bytes. Omnis Quartz also includes a procedural language with 180 commands. Omnis Quartz will ship by the end of this year, and a local-area network (LAN) version will be available in the first quarter of 1988, according to Blyth. Pricing for the LAN version has not been set.

Blyth is gearing up for a public offering next month and is expected to raise $5 million to $7 million. The firm had some $4 million in revenue in its last fiscal year.

Graphwriter goes 1-2-3

CAMBRIDGE, Mass. — Lotus Development Corp. last week revamped its Graphwriter charting package to work more closely with 1-2-3, the firm's flagship product.

The $495 Graphwriter II is marketed as an automated charting system for 1-2-3, with the ability to create up to 100 updated charts with a single command when properly configured. In addition to linking charts to 1-2-3, the package can also link charts to Ashton-Tate's Dbase.

Lotus has also adopted its 1-2-3 interface, including its menus and command structure, for use in Graphwriter II. The package now provides the ability to place multiple charts on a single page. In addition, it supports a greater number of output devices, such as laser printers and image recorders.

Graphwriter II is scheduled to ship next month. Registered users can upgrade for $75, Lotus said.

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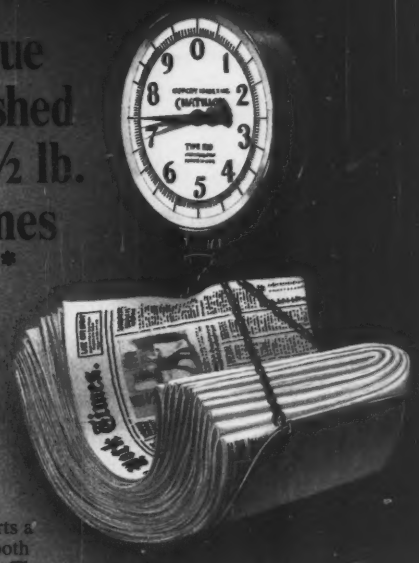

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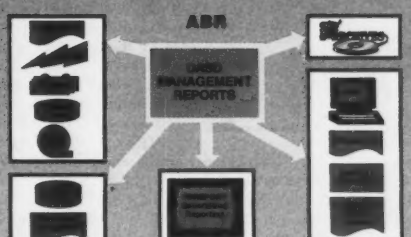

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Codex muscles up net management plan

BY PATRICIA KEEFE
CW STAFF

CANTON, Mass. — Codex Corp. last week unveiled the Codex 9800 Series Integrated Network Management System, its most ambitious network management scheme to date. However, users will have to wait until at least the end of 1988 before Codex is ready to supply most of the pieces to its modular system.

Said to feature an integrated open architecture based on the emerging International Standards Organization standards, the 9800 Series will reportedly be able to manage large, complex heterogeneous networks utilizing multiple technologies and a broad range of equipment from a mix of carriers and data processing vendors.

From a single workstation, it will combine a graphically oriented, consistent method of configuring, monitoring and controlling devices with an integrated data base and applications tools for event, fault, performance and configuration management, the vendor claimed.

Phase-in

"The broad spectrum of functionality needed to manage these networks will be phased in over the next several years," conceded Mark Davies, vice-president and general manager of Codex's Wide-Area Network Operations.

The first phase of the high-end 9800 Series is not scheduled for release until January 1988 and will reportedly support only multiplexers on Codex systems. Management of Codex modems is set to follow sometime in the first quarter. By the end of 1988, Codex claimed, the 9800 Series will be able to manage multiplexers, modems, CCITT X.25-compatible equipment and voice/data products.

Besides aligning its current product line under the 9800 Series, Codex is also promising to integrate support for products from selected vendors, including IBM's Netview. Part of that integration is expected to come in the form of strategic alliances.

Despite the multiyear delivery schedule, the 9800 Series will be available for shipment under the Codex Early Support Program in January 1988, with a base price of $61,900.

Analysts who attended a product briefing last week said they were cautiously optimistic about the 9800 Series, noting that Codex is the largest independent supplier of communications equipment. "I think their strategy is well thought out and sophisticated," said Kathryn Korostoff, a senior analyst with International Data Corp. (IDC) in Framingham, Mass.

Judgment reserved

Korostoff said the Codex presentation fell short in explaining how the 9800 Series will accomplish its goals. Despite expressing support for the concepts that underlie the 9800 Series, several analysts said they will reserve judgment until the product ships next year.

Codex's scheme is fairly straightforward, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. Codex will layer its own presentation mechanism over Netview and the Open Systems Interconnect (OSI) model, essentially covering the market.

"If it'll work with Netview, it'll work with OSI," he added.

The 9800 Series utilizes an Apollo Computer, Inc. Domain Series 3000 engineering workstation, which is based on Motorola, Inc. 68020 and 68881 processors, and includes a graphics processor, a 155M-byte Winchester disk drive and 4M bytes of memory. Also to be featured are windowing capabilities, color graphics and a mouse that lets the operator select, inventory, configure, monitor and test specific devices or groups of devices in the network.

ADR opts

FROM PAGE 1

for use with Datacom/DB, an expert system for MVS performance management and capacity planning, and a voice messaging system (see story this page).

ADR, which has been stung by IBM's aggressive moves in the data base market with the SQL-compatible DB2 [CW, Aug. 31], will move toward a policy of peaceful coexistence with DB2 under the enhanced software. With SQL support, the Ideal fourth-generation language can be used to create applications to run against IBM's DB2 as well as Datacom/DB.

The ADR software is not currently compatible with IBM's own version of SQL. However, ADR officials said they believe IBM will eventually adhere to the evolving ANSI standard, which is expected to be published next month.

"Everyone involved believes [SQL] will converge around one standard," noted William Clifford, executive vice-president and chief financial officer at ADR. "We believe it will happen, and we believe IBM wants it to happen as well."

IBM seems to be headed toward ANSI SQL compatibility. Release 3.0 of its DB2 incorporates a version of SQL that is more similar to the ANSI standard than previous releases. IBM has also said it is committed to supporting the ANSI standard.

SQL compatibility will allow Datacom/DB to run applications developed for other SQL-based systems, and it provides a framework for defining ADR's continuing implementation of new relational features for its data base management system, the firm said. Moreover, since SQL is a key sublanguage in IBM's Systems Applications Architecture, support of it will ensure that Datacom/DB will be able to remain compatible with future IBM developments.

By adding SQL support to Ideal, ADR is offering customers a way to build applications for DBMSs that can be ported to similar systems, including DB2. A customer's investments are protected because he can build applications today that can be used in the future, regardless of what DBMS he ultimately chooses, Clifford said.

Ideal Version 2.0 can run against DB2 because it is tightly coupled with DB2 through the DB2 catalog, the firm said.

'The right direction'

"This is a big step in the right direction," noted Peter Burris, an analyst with International Data Corp. in Framingham, Mass. "Given the current situation in the data base world, ADR is saying, 'We're not going to fight it, but [we are going to] do everything that we can to provide a higher performance data base than DB2 and provide better support, but at the same time maintain compatibility with DB2.' "

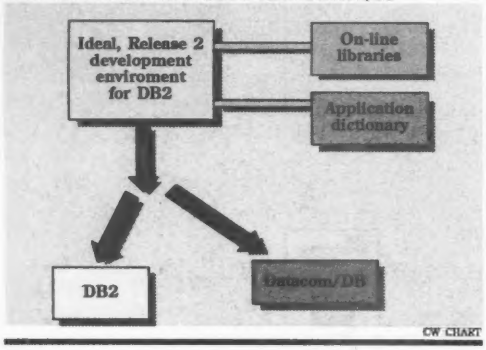
Burris said he does not feel the firm's flexible data base strategy will provide impetus for Datacom/DB users to abandon ADR's product in favor of DB2. If anything, Burris said, the approach will open new vistas for ADR. "Before, they didn't have SQL, and there were some questions about how relational Datacom/DB was, so they were getting locked out," he noted.

Datacom/DB Release 8.0 operates under IBM's MVS and MVS/XA or VSE and VM/CMS on IBM 9370, 4300, 3080 and 3090 and plug-compatible systems. It will reportedly be available in the second quarter for license fees of $145,900 for MVS and $114,500 for VSE VM/CMS environments.

Ideal Version 2.0, which operates on the same machines as Datacom/DB, but only in MVS and MVS/XE environments, will reportedly be available in the first quarter next year. Permanent license fees are $175,000, the firm said.

An Ideal relationship

Applications developed in Ideal, Release 2, with or without SQL, can be run with either IBM's DB2 or ADR's Datacom/DB



CW CHART

Datacom/DB CASE

Applied Data Research, Inc. (ADR) last week introduced its first computer-aided software engineering tool for automating the data base design and modeling of its Datacom/DB data bases.

Scheduled to be available in the second quarter of next year, Depictor resides on an IBM Personal Computer or compatible workstation with 640K bytes of random-access memory (RAM) and a hard disk. It accesses data base definitions using ADR's Datadictionary. The PC component is based on technology supplied by Cadware Group Ltd. in New Haven, Conn.

Permanent license fees are $24,000 for IBM VSE and VM/CSE environments and $28,500 for IBM MVS environments, including one copy of PC software.

ADR also unveiled an expert system for MVS performance management and capacity planning. Mindover MVS is a PC-based expert system that evaluates 14 domains of a mainframe's performance, including CPU and I/O, before drawing conclusions and offering recommendations.

Developed internally by ADR's MVS experts, the expert system requires an IBM PC AT or compatible running Microsoft Corp.'s MS-DOS 3.0 with 580K bytes of RAM and 4M bytes of hard-disk storage. Scheduled for first-quarter 1988 delivery, Mindover MVS lists for $42,500.

A version of the firm's Email electronic-mail product was also introduced. Email-Voice adds messaging in the form of synthesized speech and human voice replies to standard E-mail functionality. Because Email-Voice is fully integrated with ADR's Ideal and Dataquery software, information from the corporate data base can be stored as an Email message and played back in either a human or computer-synthesized voice.

The voice messaging system requires ADR's Email and speech synthesis/digital sampling system and interface products developed by Speech Plus, Inc., a company in which regional Bell holding company Ameritech owns a minority interest. Combined prices start at $54,000 for VSE, $64,500 for VM/CMS and $67,500 for MVS environments.

ADR also disclosed an aggressive financing plan offered through Ameritech Credit Corp., its parent company's equipment leasing subsidiary. Through Ameritech, ADR hopes to offer finance charges approximately 1½ points lower than those offered by independent vendors and flexible payment schedules, said Steve Gerrard, vice-president of ADR's Software Products Division.

"This puts us on an even keel with IBM in dealing with customers, since we'll be using our parent company like IBM uses IBM Credit Corp. — as a bank," Gerrard said. "It also provides us with some means of differentiation from other independent software companies."

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by M. Pehm

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N E W S

Net analysis field grows

Ungermann-Bass cultivates Net/Scope tool

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — Ungermann-Bass, Inc. last week introduced Net/Scope, a turnkey network management system said to enhance the ability of network managers to quickly diagnose problems and analyze network performance.

With Net/Scope, Ungermann-Bass jumps into the mushrooming market for network analyzer packages. Other recently introduced packages include The Sniffer from Network General, Inc. in Sunnyvale, Calif.; Lanwatch from FTP Software, Inc. in Boston; and Lanalyzer from Excelan, Inc. in San Jose, Calif.

As a major addition to the Net/One network management family, key Net/Scope features include the ability to capture information and gather statistics, alert and filtering capabilities and unattended network monitoring.

The information capturing capability reportedly enables a network manager to selectively review any network data packet, store packets for later review and create software "triggers" that start or stop data storing.

Selective review of network traffic, either workstation-to-workstation or segment-to-segment, allows Net/Scope to quickly identify any source of network data problems, the vendor claimed.

The alert capability reportedly provides immediate warning of any observed network errors.

Net/Scope is an extension of the vendor's current Net/One network management family. Network planners and engineers can gather in-depth information about their networks that is unavailable using Ungermann-Bass's Network Management Console (NMC) or Network Control Console alone.

The package includes Net/Scope software, a network interface unit and documentation. The interface unit can be added to an NMC to enable the Net/Scope program to use the NMC's utilities.

Changes role of PC

Net/Scope turns a personal computer into a network management workstation. IBM's Personal System/2 family is not supported. Security is preserved by limiting Net/Scope's operation to those PCs equipped with the network interface unit.

Networks supported include IEEE 802.3 Ethernet, Net/One broadband and Net/One fiber-optic interfaces, as well as the lower two layers of Digital Equipment Corp.'s Decnet.

Net/Scope scrutinizes the bottom layers of the International Standards Organization's Open Systems Interconnect model for nets using Transmission Control Protocol/Internet Protocol and Xerox Corp.'s Xerox Network Systems protocol.

Available now, Net/Scope costs $7,500 for the NM0150 baseband model and $8,150 for the NM0160 broadband model, which includes a modem. These prices include a $5,000 software right-to-use charge.

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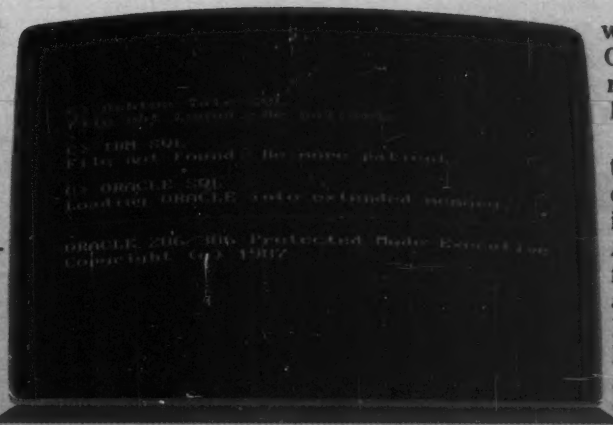
- Ashton-Tate has announced its intention to replace its outdated database technology with a SQL DBMS under OS/2, and
- IBM has announced its intention to offer SQL for OS/2 in its Extended Edition.



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Northern Telecom offers net control

BY ALAN ALPER
CW STAFF

NEW YORK — Northern Telecom, Inc. last week unveiled Meridian Customer Defined Networking, an assemblage of products, applications and support tools said to allow large organizations to configure their own hybrid networks.

The networking architecture is based on a modified version of DMS-Supernode, a modular digital central-office switch being marketed to telephone companies and interexchange carriers [CW, July 13]. Also packaged with the switch, called Meridian Supernode, are applications and network control components to configure and manage hybrid networks.

Meridian Customer Defined Networking is based on industry-standard protocols and features an open architecture that facilitates peer-to-peer internetworking among an organization's private and public networks.

"It gives large organizations, for the first time, end-to-end applications across hybrid networks and access to network management and service capabilities similar to those used by telephone companies and interexchange carriers," said Ed Tagg, group vice-president of data communications and networks.

Northern Telecom said it hopes the products will appeal to large corporations and government agencies that use a combination of public and private network facilities and services. "Market research shows, in fact, that over three-quarters of all corporate networks today are hybrid networks," noted Desmond Hudson, Northern Telecom's president.

Analysts said the approach will be useful to larger corporations that already act as their own telephone companies.

Hudson said Meridian Customer Defined Networking will primarily be marketed by systems integrators but that if customers want, it can be installed directly by Northern Telecom.

The firm reportedly had intended to disclose a systems integration relationship with Electronic Data Systems Corp. (EDS) last week at a press conference in New York but abruptly canceled the announcement, saying the agreement had not been concluded. Hudson declined to say what the EDS agreement would entail or when it is expected to be concluded.

EDS acknowledged that it is testing Northern Telecom's Meridian products but declined to say whether an agreeement is forthcoming.

Building net for GM?

EDS is believed to be using Northern Telecom equipment to build a corporatewide network for its parent, General Motors Corp. The agreement under discussion would reportedly make EDS a systems integrator using Meridian Customer Defined Networking to construct custom networks for other corporations and government institutions.

Meridian Supernode, available now, is fully compatible with Northern Telecom's Meridian SL-1 and SL-100 integrated services networks, DPN packet-switching systems and Meridian Digital Centrex lines.

Roland Zalite, Northern Telecom's director of strategic marketing, said that a customer with 10 locations on a network served by an SL-1 integrated services network would have to spend about a half-million dollars to upgrade its architecture to provide some of Meridian Customer Defined Networking's capabilities.

One Of
Our Products
Is A Legend,

Wang enrolls in ISDN net trials

LOWELL, Mass. — Wang Laboratories, Inc. last week announced it has joined McDonald's Corp. and Illinois Bell Integrated Services Digital Network (ISDN) trials at McDonald's facilities in and around Oak Brook, Ill.

Wang actually joined the ISDN trials at McDonald's in June and has agreed to participate through the end of the trial, which concludes in mid-1988.

Wang is supplying its recently announced Wang Professional Computer 280s to demonstrate voice and data applications available through the ISDN standard for workstation connection, known as the ISDN Basic Rate Interface.

The PCs are equipped with interface cards that conform to the Basic Rate Interface and provide McDonald's users access to simultaneous voice and data communications over standard, or unshielded, twisted-pair telephone cable.

The PCs are located in five separate buildings and are able to communicate with a Wang VS 100 minicomputer at the McDonald's Oak Brook headquarters.

The interface cards connect to the telephone lines via a modular jack and allow connection between the personal computers and the Wang VS via an AT&T #5 ESS switch located in Illinois Bell's Oak Brook central office. The transmission adheres to the ISDN 2B + D signaling format.

The interface cards are not yet available.

Honeywell Bull to ax U.S. plants, old systems

Says closings will streamline operations; Level 62 and DPS 4 users get migration path

BY JEAN S. BOZMAN
CW STAFF

CINCINNATI — Honeywell Bull, Inc. plans to close some U.S. manufacturing plants this fall and to phase out its aging Level 62 and DPS 4 machines in favor of the firm's newer DPS 7000 line.

Honeywell Bull President and Chief Executive Officer Jerome Meyer revealed those plans here last week at a meeting of the North American Honeywell Users group (NAHU), where he outlined strategic directions being taken by the 6-month-old company formed by Compagnie des Machines Bull of France, Honeywell, Inc. and Japan's NEC Corp.

In his speech, Meyer said the company plans to streamline through plant closings during the next three to six months. "We need to get our capacities in line," Meyer said following his speech. "We have redundant production capabilities around the world. And in the U.S., we have much more than we need over the next five years." He did not provide details of the expected closings.

To users of the Level 62 and DPS 4 systems, Meyer said, "We have a program that's going to bring you over to the DPS 7000." The installed base of the older machines is relatively small, with about 200 Level 62 systems in the U.S. However, users will be forced to migrate to the GCOS 7 operating system, using software being developed in England.

There are only 55 DPS 4 machines installed in the U.S., Honeywell Bull spokesmen said, and several hundred more in Europe. In contrast, there are more than 2,000 DPS 7s worldwide and more than 50,000 DPS 6 machines. Several DPS 4 users said they were surprised by the official confirmation that their system would be phased out. "I'm just sitting here in shock," said Craig Wiester, data processing manager at Sico, Inc. in Minneapolis. "They're forcing us into a conversion situation."

Major enhancements expected

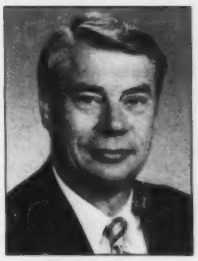
The DPS 6 and DPS 7 — the mainstays of the Honeywell Bull line — will receive major enhancements next year, *Computerworld* has learned. The widely installed DPS 6 is slated to get a new high-end machine, called the HRX, running at about 8 million instructions per second (MIPS).

That compares with a performance rating of about 3 MIPS for the DPS 6 Plus. The HRX will reportedly have up to four processors connected to one bus.

Two models of the DPS 7000, designed and built in France, will reportedly be marketed in the U.S. next year, the Honeywell spokesmen said. Called the Models 1017 and 1027 in Europe, the machines will be in the IBM 3090 Model 150 and Model 180 power range. The highest rated DPS 7 sold here, the DPS 7000 Model 50, is roughly equivalent to the IBM 4381. Separately, Meyer indicated that there is also a forthcoming high-end processor from NEC, which owns 15% of Honeywell Bull.

Honeywell Bull, with 20,000 employees, will have achieved $2 billion in sales by April 1988, after one year of operations, Meyer said. Much of its income is coming from the company's role as exclusive supplier of computer systems specified under part-owner Honeywell's federal contracts, he added.

Users seemed cautiously optimistic about the steps their vendor is taking. But there is, increasingly, the fear that the French owners from Groupe Bull will use their 1988 option to increase Bull's share of the firm from 42.5% to more than 60%.



Jerome Meyer

One problem with French development is that it takes time for Americans to learn about new products. "Typically, we do run a little bit behind the Europeans in finding out about new products," said David Adkins, data processing director for Placer County in Auburn, Calif., a NAHU session leader.

A striking example of the knowledge gap is the high degree of French familiarity with upcoming products now being tested in France. Two NAHU attendees from the Banc Nacional de Paris said they knew of a DPS 4 migration package being developed by a Honeywell Bull software team in Britain.

Such gaps in knowledge are being recognized by European users, including Roland De Conihout, president of the EFOB-HUA/CUBE users groups in Paris, who addressed NAHU.

"The international aspect of Bull is becoming something important in Honeywell's strategy, and we feel that we, as users, can't afford to be outside this trend," he said. "We have tried to devise more contact between users on both sides of the Atlantic Ocean."

But We're Still A Mystery

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Sound too good to be true? It's not. That's the difference between a legend and a myth.

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Multimate stakes claim in LAN market

BY STEPHEN JONES
CW STAFF

TORRANCE, Calif. — In an attempt to bolster its waning presence in the word processing market, Ashton-Tate last week announced a local-area network (LAN) version of its Multimate Advantage II word processor.

The $1,495 package, which includes one server and five workstation modules, is available immediately. Additional workstation modules cost $150 each.

Multimate Advantage II LAN operates on a variety of networks, including the IBM Personal Computer LAN, Novell, Inc.'s Advanced Netware/86 and 286 and 3Com Corp.'s 3+. In addition to the capabilities of the stand-alone version, the LAN package features document sharing, file locking and individual customization of system defaults.

Irene Patti, product manager at Ashton-Tate's East Hartford, Conn., operation, claimed the LAN version will be a "strong contender" in the Fortune 1,000 market, in which the use of LANs is skyrocketing. Beta-test versions of the package have apparently already won over some big corporate users who gave Multimate Advantage II LAN high marks.

"Speedwise, it's a superstar, very fast; and the added network features are almost transparent to the user," said Warren Winter, systems planner for Pfizer Corp.'s purchasing division in New York.

Winter, who has used a beta-test version of the product for a month, said the program's user interface is more friendly than its predecessor's, the Multimate Advantage 3.6 LAN version. That package's file locking would boot a user to the DOS level; the new version keeps the user in the program with a "wait" message on a document-summary screen.

Dbase IV

CONTINUED FROM PAGE 1

tions Architecture, a proposed common interface for applications.

Additionally, SQL is important as Ashton-Tate moves into direct competition with the likes of Oracle, Relational Technology, Lotus, Microsoft and IBM — all of which compete in or intend to enter the SQL arena.

SQL support 'mandatory'?

"It's mandatory that Ashton-Tate support SQL — there's really no choice," said William Shattuck, an analyst with Montgomery Securities, Inc. in San Francisco. "Now it's a question of how they're going to position themselves against the eight or 10 other companies that are in the same market."

Rick Sherlund, a software analyst with Goldman, Sachs & Co., agreed. "Don't bother putting it out if it doesn't have SQL," he advised.

But sources said Ashton-Tate does plan to give the product some SQL capabilities. "It was one way only: SQL to Dbase. They had an SQL-to-Dbase translator, and that is all that they had ever accomplished," a former key Ashton-Tate Dbase developer said of the firm's progress as of this summer.

Others agreed. "It allows programming in SQL but does not allow Dbase to query a host data base. That won't happen until they separate the engine," said Tom Rettig, founder of Tom Rettig Associates, a vendor of Dbase tools.

According to the ex-Ashton-Tate developer, the package's SQL will be consistent with IBM DB2 but not the ANSI standard. As a result, it may allow DB2 to query Dbase. This, however, is considered less useful than using Dbase to query the mainframe.

Others key features that Dbase IV will lack are data recovery, commit and rollback, which most SQL products currently contain, sources said.

The Dbase architecture, the defections of key developers and Ashton-Tate's late start in serious SQL development have limited what can be done with SQL. 'They are restricted by the current Dbase architecture. It is not sufficient for a full implementation of an SQL engine," said Rich Finkelstein, vice-president of the Codd & Date Consulting Group's Midwest Region in Chicago.

"There may be some very major restrictions, like lacking unions [more than two table joins]," Finkelstein said. "I believe they will come out with a subset of the SQL language, which means that the users will not realize anywhere near the power of the full SQL engine."

Dbase IV was originally thought to be scheduled for announcement in early November, with shipment by early 1988, but that introduction may be held up due to technical problems, some of which involve SQL. "They were supposed to ship an alpha version on September 15 but missed it," a third-party developer said, adding that the system would freeze when various commands were invoked.

In order to hasten its SQL development, Ashton-Tate acquired a team of SQL developers and an SQL product from Wordtech Corp. in April. The Wordtech SQL product was announced in August 1986 but never shipped.

West Coast correspondent Stephen Jones contributed to this report.

Compuware Takes The Mystery Out Of CICS

Compuware takes the mystery out of CICS by making three exceptional interactive testing and debugging tools to gain control over it. Exceptional because their powerful individual functions help stabilize applications and systems. But what's truly unique about them, is how well they work together. So that, as a threesome, they have all the smarts to form a systems control center — at one terminal.

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Dell targets corporate micro market

BY JULIE PITTA
CW STAFF

AUSTIN, Texas — Dell Computer Corp. last week trimmed prices on some existing microcomputers and added a number of configurations to its product line as part of the company's efforts to penetrate the corporate marketplace.

Prices on seven models of Dell's PC's Limited line were reduced by as much as 12%. Dell cut the prices on four of its Intel Corp. 80386-based microcomputers, which began shipping in May, as well as on two Intel 80286-based systems and one Intel 8088-based personal computer.

Under the new price structure, Dell's five 8088-based systems range in price from $799 for a monochrome system with a 360K-byte floppy disk drive to $1,899 for a 40M-byte hard disk drive IBM Enhanced Graphics Adapter (EGA) system, previously priced at $2,149.

Additionally, Dell added an 8088-based PC for a monochrome system with a 40M-byte hard disk drive.

Prices for Dell's four 8-MHz 80286-based PCs now range from $1,799 for a monochrome system with a 20M-byte hard disk drive to $2,499 for an EGA system with a 40M-byte hard disk drive, previously priced at $2,649.

Added were two 12-MHz 80286-based microcomputers — a monochrome system with a 150M-byte hard disk drive, priced at $4,399, and an EGA system with a 150M-byte hard disk drive, priced at $4,899.

Dell's six-model 80386-based line was enhanced by four price cuts. The price on a previously introduced 40M-byte monochrome system was rolled back to $4,299 from an original $4,499, while an 80M-byte monochrome version was reduced to $4,699 from $4,899.

Prices were also cut on two EGA 80386s. A 40M-byte hard-disk version was trimmed to $4,799 from $4,999, while a 70M-byte hard-disk model was reduced to $5,199 from $5,399.

Graham Beachum, Dell senior marketing and sales vice-president, said he expects the price reductions to increase the company's share of the corporate market. He projected that Dell's 80386 line will represent the greatest percentage of its systems sales.

"We're out to target IBM," Beachum said, noting that Dell's systems are compatible with the OS/2 operating system being developed by IBM and Microsoft Corp. "I haven't found a lot of MIS directors sitting on the edge of their seats for the IBM Personal System/2."

Tech graphics tool arrives

BY ED SCANNELL
CW STAFF

RICHARDSON, Texas — Micrografx, Inc. this week is set to introduce a program that is compatible with IBM's Personal Computer series and addresses the needs of both graphic artists and users who do technical illustrations.

Designer, a vector-oriented resolution-independent program, permits users to create complex artwork and illustrations by tracing scanned images or to construct complicated architectural designs. The company said it thinks Designer will accomplish on the IBM-compatible side what Adobe Systems, Inc.'s Illustrator has accomplished in the Apple Computer, Inc. Macintosh-compatible world.

Designer covers the needs of a niche market that previously has not been addressed in the IBM-compatible market, the vendor said. Previously, developers have written programs targeting just graphic artists or just technical draftsmen but never a program that addresses the needs of both, according to Paul Grayson, Micrografx chairman and chief executive officer.

"For example, we have graphic artists at McDonnell Douglas that want to import scanned images and trace over them using spline curves. But on the other hand, we have users at Boeing that want technical drafting features, like the ability to do autodimensioning," Grayson said.

Written for Windows

One advantage Designer has over its competitors, according to Grayson, is that it is written to work with Microsoft Corp.'s Windows graphical operating environment. He said this will be more attractive to new users than the "mainframe-style interfaces" used by packages such as Autodesk, Inc.'s Autocad.

"We think we have a unique definition of drawing and drafting systems for non-engineers, although we think it is useful for engineers as well," Grayson said.

Some of the program's design features include the ability to import, merge or save bit-map images from scanners and to do polygon and curve editing.

Designer carries a suggested retail price of $695 and is bundled with Windows Convert, an Autocad translator. The program is scheduled for release in the fourth quarter.

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AT&T Mail reaches out farther

MORRIS PLAINS, N.J. — AT&T last week introduced interconnection of AT&T Mail to other electronic mail systems, including Digital Equipment Corp.'s Mailbus.

Gateway400 is a service enhancement incorporated in the AT&T Mail messaging system and is said to link to other systems that use the CCITT X.400 recommendation for message-handling systems.

Using Gateway400, AT&T Mail subscribers can exchange messages with E-mail users served by Telecom Canada's Envoy 100, making it the first commercial international electronic mail link of its kind, AT&T claimed.

AT&T Mail will also link to DEC's Mailbus, which can interconnect multiple E-mail systems, including IBM's Systems Network Architecture Distributed Services and Distributed Office Support System, or Disoss. AT&T subscribers will be able to exchange messages with users of DEC's All-In-1 equipped with the appropriate X.400 software.

As new interconnections are made with other vendors, AT&T Mail subscribers will be able to extend electronic order-entry and information-exchange applications into other countries, AT&T claimed. Within the U.S., subscribers can access messages electronically at their personal computers and terminals, and they can hear Mail Talk's synthesized voice read their messages over any Touch-Tone phone.

To communicate to non-AT&T Mail subscribers, messages that are electronically input are delivered automatically in hard copy by AT&T Mail to the U.S. Postal Service, a courier or telex. In addition to messages, subscribers can send binary files like spreadsheets and computer files. AT&T Mail charges, which are based on the length of the message a subscriber sends, typically range from 40 to 80 cents within the continental U.S. Sending messages to Envoy 100 users in Canada will cost an additional 25 to 30 cents per message, according to AT&T.

MS-DOS 'host' lets terminals double as PCs

BY ED SCANNELL
CW STAFF

NEWPORT BEACH, Calif. — A privately held networking company last week introduced a microprocessor-based system designed to provide Microsoft Corp. MS-DOS applications to as many as 100 ASCII terminals while retaining their terminal functions.

The Centaur II mainframe, unveiled by Data Voice Solutions Corp., uses up to 100 NEC Corp. V40 application processors — compatible with the Intel Corp. 8-MHz 8086 — to provide ASCII terminal users with applications designed for the Microsoft operating system, such as Lotus Development Corp.'s 1-2-3.

Supporting most ASCII terminals through Novell, Inc.'s Netware operating system or through a private branch exchange (PBX), the product can also be linked to a variety of minicomputers and IBM mainframes.

PC functions at mainframe level

The system centralizes microcomputer functions at the host level while retaining compatibility with MS-DOS, according to Jerry Kappenman, Data Voice's senior vice-president of product marketing.

Currently, corporate users who access minicomputer and mainframe applications through ASCII terminals are forced to buy microcomputers if they want MS-DOS compatibility. Centaur II eliminates this need by essentially turning users' terminals into workstations that run MS-DOS-compatible software. Conversely, users retain connectivity to their host system.

"No one that we can see is bringing DOS to the 24 million terminals out there. That is a major market," Kappenman said.

Centaur II can contain between one and 100 applications processors, each of which is a "PC on a card," Kappenman said.

Terminals attached to the system use the applications processors to run MS-DOS programs. They can be wired directly to the processors on a one-to-one basis using standard telephone wiring, a data switch or voice/data PBXs to increase the number of terminals supported.

Centaur II supports most ASCII terminals, including Digital Equipment Corp.'s VT100 and compatibles. "This allows DEC users to keep their investment of method of doing things and to also become casual users of popular DOS programs like 1-2-3 and Dbase III," Kappenman said.

It also allows IBM's Personal Computers and Personal System/2s to be connected as on-line workstations using Novell-compatible interface hardware such as Ethernet, Arcnet or IBM's Token-Ring Network.

Prices for the Centaur II mainframe, which is housed in a standard 19-in. rack, range from $50,000 for a 30- to 40-user configuration to $185,000 for a version that can support as many as 500 occasional users.

Compuware Takes The Mystery Out Of Databases

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*Available fourth quarter.

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Celerity dives into near-supercomputer fray

BY JAMES CONNOLLY
CW STAFF

SAN DIEGO, Calif. — Celerity Computing last week launched a drive from its base in superminicomputers into a higher level of technical computing with the introduction of its first near-supercomputer.

The Celerity 6000 is a 64-bit departmental multiprocessor that the vendor positioned against the near-supercomputers sold by Alliant Computer Systems Corp. and Convex Computer Corp. and IBM 3090 Model 200E mainframes with the IBM Vector Facility.

Celerity officials claimed an installed base of 160 systems as of June, with 95% of those machines being used in scientific and engineering applications. "We're getting out of the superminicomputer arena and into the supercomputer market," said Robert P. Ollerton, director of product marketing for Celerity. He said the company will continue to offer its two primary superminis, the C1230 and the dual-processor C1260.

A first

Like the 3-year-old C1200 line, the 6000 is Unix-based and uses reduced instruction set computer technology. The 6000, available with up to four scalar processors or up to two vector processors working in combination with two scalar processors, is the first Celerity to perform parallel processing by breaking down a problem to run simultaneously on several CPUs, according to Ollerton.

Ollerton claimed that a key consideration in the 6000's design was Celerity's desire to balance performance. "Some computers have great vector and crummy scalar performance. Some people have great vector and scalar performance but poor I/O," said Ollerton, claiming that the 6000 can handle 40 million floating point operations per second (MFLOPS) per processor, move 40 million 64-bit words per sec. from memory and translate 40 million addresses per sec.

He said simulations show the 6000 with four scalar processors can process more than 60 million Whetstone instructions per sec., compared with about 40 for an Alliant FX/8 with eight compute elements. He said the 6000 with one vector processor and one scalar processor performs 8 MFLOPS in a 100-by-100 full-precision Linpack benchmark, compared with 12 MFLOPS for an IBM 3090 and just under 8 MFLOPS for an Alliant FX8.

The 6000 has a cycle time of 25 nsec and a 90M byte/sec. I/O subsystem. It is available with up to 832K bytes of cache, 1G byte of memory and 44G bytes of disk storage.

Due to ship in November, the 6000 costs $250,000 with 32M bytes of memory, a Unix license, 690M bytes of disk storage, a tape backup and a console.

X Windows gets push from MIT

BY DAVID BRIGHT
CW STAFF

BOSTON — Hoping to further boost its X Windows system as a de facto standard, MIT announced last week at the Decworld exposition here a new version said to incorporate richer graphics and more design extensibility.

X Windows is a portable architecture for developing network-based windowing applications for workstations. The architecture was originally developed at MIT, but since January, it has gained support from several major manufacturers, including IBM, Apollo Computer, Inc., Data General Corp., Hewlett-Packard Co. and Sun Microsystems, Inc., in addition to Digital Equipment Corp.

MIT also announced that it is forming a consortium of industrial companies to continue X Windows development. DEC, host for the announcement, said it is enthusiastically supporting X Windows but would not say when it plans to introduce related products and applications.

Sun initially was promoting its competing, Postscript-based Network Extensible Window System (NEWS), but last April, the firm joined the X Windows movement, saying it would merge NEWS with the new version of X Windows.

Version 11 of X-Windows represents "a fairly complete redesign," said MIT's Robert Scheifler, who will be director of the consortium. While Version 10 was "very much a university research project," Version 11 has a more industry-related focus, he said.

For example, Scheifler said, the new version should help smaller companies because it allows for greater flexibility in designing extensions.

Now that X Windows is a de facto standard, added MIT's Steven Lerman, the next major step is to build an application base.

"We are zealous advocates of the X Windows system," stated Richard Treadway, work-system software program manager at DEC. "X Windows on workstations is the design center for all new application development" and "will play a pivotal role in the transition from time-sharing to distributed computing."

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EDITORIAL

No Greene light

If you could group the seven regional Bell holding companies into one, the resulting $67 billion entity would have greater financial might in the communications arena than IBM holds in the mainframe computer industry. It is in this light that Judge Harold H. Greene's recent ruling on further deregulation should be read; further illumination can be obtained from the carefully crafted arbitration ruling delivered last week in the settlement of the IBM and Fujitsu Ltd. dispute.

Settling a confrontation that dates back to 1983, the arbitration panel, in essence, found that competition in the mainframe market requires the ability to offer IBM-compatible operating system software; access to the mainframe market is, in effect, bottlenecked by the proprietary control IBM exerts over that market. The panel has guaranteed Fujitsu access to IBM software technology — strictly supervised to prevent copying — in order that the Japanese firm can develop the interface characteristics to enable its software to run on IBM machines and, by logical deduction, enable it to keep Fujitsu machines fully compatible with the IBM standard.

That ruling recognizes that, no matter how well intentioned it is, a business that completely dominates a particular industry must make accomodations to foster the dynamic of competition on which the free-market system thrives.

The 1982 decree separating the holding companies from AT&T did not instantly create a fully competitive communications industry. Greene's decision of two weeks ago is based on the view that what exists today are seven mini-Bell systems, each invested with the monopoly power and inherent potential for abuse on the regional level that dominated the U.S. for decades under the national Bell system.

Each of the seven entities maintains a monopolistic control of the local-exchange bottlenecks through which almost all locally generated communications traffic must pass to connect to a long-distance carrier. This provides the potential to hamper independent companies' use of the networks if their products were to compete with a similar offering from the network's owner. Additionally, Greene declared that if the regionals were able to buy equipment from their own subsidiaries, they would close off 70% of the market.

The regionals complain bitterly that the long-distance market is open to everyone but them and that technology and local regulatory agencies are rapidly eroding their monopolistic power over regional networks. However, Greene rightly held that, for practical purposes, it is economically impossible to duplicate the point-to-point connection that the Bell networks provide until future technological developments provide an alternate connection scheme.

Rather than whittling AT&T down to size, it is more likely the regional companies, with the benefit of local exchange monopolies, would squeeze out some 530 independents lacking those added resources.

LETTERS TO THE EDITOR

Protect thyself

In "Users' rep ranks PC vendors, decries Lotus copy protection" [CW, Aug. 17], you ran a generally informative article concerning the Capital PC User Group, Inc. The article clearly focused on the importance of service in the microcomputer industry. It also refers to President Jerry Schneider's concern for copy protection by Lotus Development Corp, but only as a general item in line with nine other discussion areas. One wonders why copy protection ended up as a headline, when one of the major reasons for the growing technical support concerns is directly related to the inordinate number of pirated software programs.

He also implied that protecting a program was a disruption, a nuisance and caused many problems for the user. How these occur was not made clear.

The technical effectiveness of most copy protection programs has improved to where there is virtually no legitimate argument against it. Serious software developers cannot afford to release an unprotected program if they expect to receive an acceptable return on their investment.

Many technical support calls are directed to software developers that are a direct result of pirated copies. The sales successes hopefully realized by non-protection are coming back in significantly increased support costs and decreased revenue due to the lost sales. One certainly invites a practical suggestion for Lotus, other than copy protection, that will ensure the position they now maintain.

Jim Christoffersen
Vice-President of Sales
Vault Corp.
Newbury Park, Calif.

Changes due

In regard to "Women making strides in MIS" [CW, Aug. 17], may I state that, once again, *Computerworld* has come to the point of the problem, though perhaps not the obvious one. If women were really making strides in MIS, then the second headline would have read "Old chauvinism fading as women attain management positions" instead of ". . . as young men attain management positions."

Speaking as a woman educated and trained in data processing, I can tell you that working with a "young man" who has little experience and training can be very frustrating, especially when you are in the middle of a conversion from an IBM System/36 to a Digital Equipment Corp. Microvax II, and he knows nothing about either. I can tell you that I am one woman who will not just stay and put up with it, and neither should anyone else. That is how we can bring about a change — how unfortunate for all involved.

Catherine L. Gilbert
Jackson, Miss.

This week in history

Sept. 19, 1977
Computers come aboard many of the boats in the 23rd America's Cup Challenge in Newport, R.I., in a big way. Both finalists — the American defender Courageous and Australian contender Australia — sport sophisticated systems, while 50% of the original half-dozen entrants say they place great reliance on computers for accurate speed, wind and position information.

Sept. 20, 1982
IBM discharges and sues three high-ranking employees for allegedly misappropriating secret information about the IBM Personal Computer. The suit is also filed against Bridge Technology, Inc., a company IBM claims was founded by the ex-employees and which tried to sell design information about unannounced PC products.

School daze

As an MIS educator witnessing the confusion surrounding the curriculum and decline in enrollments, I was very interested in the feature articles on the crisis in MIS education [CW, June 15 and 22].

Some of what was said was confusing. Particularly so were the statistics compiled from 700 MIS business professionals regarding the educational competencies of recent MIS hires printed in a sidebar in the second part of the series. Forty-five percent cited interpersonal, business and verbal and written communication capabilities as the most deficient skills among computer science graduates.

However, the questions posed were about computer science programs, not MIS programs. Thus, it was not clear if MIS graduates, as opposed to computer science graduates hired by MIS departments, also have the same deficiencies. MIS graduates from business schools typically have a more thorough grounding in business and

Continued on page 22

The false profits of vendor strategies

FRANCIS GENS

IBM's disk and controller announcement this month was impressive. While the increased 3090 channel speed and higher performance and capacity disk drives are strong offerings, the product most likely to cause plug-compatible manufacturers concern is the 3990 disk controller.

And, in a tip of their cap to the installed base, IBM even announced support of "standard" 3380s (AAs and Bs) — which are now 2-generation-old devices — on the new controllers.

One thing that IBM did not announce, however, was increased channel speed for 3080 series mainframes. This shouldn't be too surprising.

WILL the assumptions that IBM is building into its mid-range processor strategy still hold true in 1991?

Since used 3080 series machines actually compete with 3090s, nearly everyone agrees that it would be stupid for IBM to enhance the 3080 series with 4.5M byte/sec. channels (or with anything, for that matter).

Would you believe, however, that in 1985 a knowledgeable IBM spokesman publically stated a strategy in which the 3080 series would be enhanced feature by feature along with the 3090, at least until 1989? Here's the story:

A large, diversified financial services company held a planning meeting for its senior MIS executives in southern Florida in April 1985. Following my presentation on "Industry Trends," an IBM speaker known as a straight shooter spoke on "IBM Mainframe Directions."

Since the 3090 Model 200 would not start shipping in volume until August of that year, and the 150 and 180 models would not be announced for almost another year, it was important to convince customers that the 3081 and 3083 were not dead products.

This IBM employee was convincing. The key statement in his speech was, "With the exception of expanded storage and engineering/scientific computing [the Vector Facility was not yet announced], any enhancements to the 3090 will also be available on the 3080 series— until 1989/1990."

Most of us in the audience couldn't believe what we had heard. The statement was repeated in the question-and-answer period. Was IBM saying the 3090 was only going to differ from the 3080 series — aside from the expected difference in processing power and main memory — in two seemingly esoteric areas? This plan seemed both generous (protecting 3080 series users' investment like never before) and dumb (risking negatively affecting 3090 series sales).

'Catches'

Among the 3090 enhancements that many expected were 4.5M byte/sec. channels. One of the things the IBM spokesman's statement seemed to suggest, therefore, was that IBM would also offer high-speed channels on the 3080 series. Since this idea seemed so crazy, I began to think of "catches": IBM would probably price the 3080 series enhancement so high it would be impractical; or it would announce the 3080 channels but delay delivery so long that customers wouldn't wait.

Well, a lot happened in the subsequent two years. The booming mainframe market of 1983 and 1984 turned into the doldrums of 1985, 1986 and 1987. And IBM did such a good job convincing customers that the 3080 was a solid box that many bought inexpensive, used 3080s instead of 3090s. In the slowed-down mainframe market, IBM discovered it couldn't afford the generous 3080 series enhancement policy that it had articulated in April 1985.

Let's face it, when business is tight, does it make sense to spend development (and support) dollars enhancing a product that you no longer actively sell and that may actually compete (on the used market) against your current product? Absolutely not. The fact is that anyone with any sense based 3080 acquisitions on an assumption that the family would be completely replaced by 1986, enhancements or no enhancements.

Yet the people sitting in that Florida meeting no doubt made large acquisition decisions that were at least partially influenced by that information and the per-

Continued on page 22

Gens is vice-president of technology assessments for the financial services group of International Data Corp. in Framingham, Mass.

Hypercard in hyper(con)text

Apple's fast, flexible file manager offers endless programming

ESTHER DYSON

Standing outside The Computer Attic in the Palo Alto dusk not long ago, I pointed to an ad for Apple's Hypercard ("Here now! Only $49.95") and asked the stranger beside me if she knew what it was. No, she didn't. But a thought came to her: "Maybe it makes it go real fast."

Well, not quite. If Apple Computer, Inc. can adequately explain Hypercard in particular, and hypertext in general, it will provide a real service. Many fans of the concept are pleased with Apple's entry, since it will broaden the market for a powerful new capability.

Aside from its intrinsic value, the most striking aspect of Hypercard is how vividly it expresses the Apple and Macintosh spirit. As IBM starts to catch up with the Macintosh in terms of friendliness (with a little help from its third-party friends), Hypercard is the new systems underpinning that will keep the Macintosh ahead in the next round of environment wars.

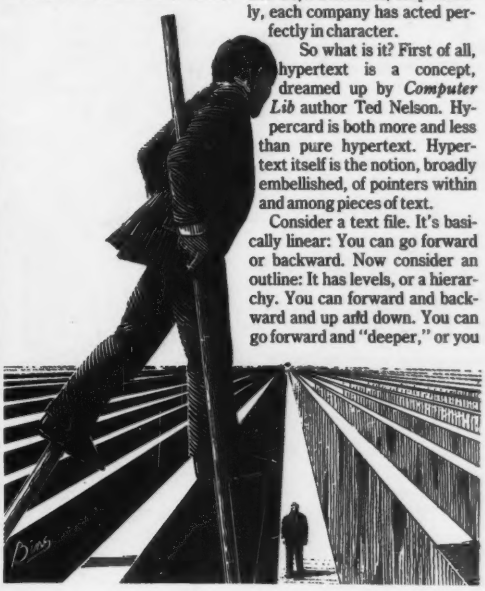
Hypercard is a very personal tool; on the positive side, it makes the user feel powerful and the computer seem responsive. On the negative side, it doesn't do very much by itself; except for the search-and-sort facilities of the file manager, the user must build all the links by hand.

In contrast, consider IBM's OS/2 Extended version, which perfectly expresses the IBM spirit. Like Hypercard, it's a way of extending the operating system to give its vendor a unique, semiproprietary advantage. (I expect to see knock-offs of both products shortly).

But while Apple empowers the user, IBM empowers the DP manager, who wants to be able to manage large relational data bases and set up communications links with mainframes and other systems. With Hypercard and OS/2 Extended, respectively, each company has acted perfectly in character.

So what is it? First of all, hypertext is a concept, dreamed up by *Computer Lib* author Ted Nelson. Hypercard is both more and less than pure hypertext. Hypertext itself is the notion, broadly embellished, of pointers within and among pieces of text.

Consider a text file. It's basically linear: You can go forward or backward. Now consider an outline: It has levels, or a hierarchy. You can forward and backward and up and down. You can go forward and "deeper," or you can go forward at the same level and skip over lower levels.



CHRISTOPHER BING

However, the text file is still basically linear. If you were to "stretch" the outline, moving everything to the same level, you would still have a linear document, perhaps with numbers marking the different levels.

Hypertext enriches that idea with the notion of skipping around at will within the document or out to others; there's no reasonable way to "stretch" it into linear form or catch all that richness on paper. The closest we get is footnotes, cross-references and parenthetical phrases (a pale, paper form of hypertext).

Every time a document says "See also," a hypertext would have a pointer to that other document itself. You could examine it and then move on from there, or you could go back to where you were. ("This background material is interesting, but I want to get back to the story.")

Linked bits

Traditional hypertext considers all text as linked bits of text. Documents are assembled from needs. After all, the encyclopedia rarely begins at "A"; it begins wherever you start your search for information.

For example, you could turn a reference or etiquette manual into hypertext, with links from soup spoons (in the appetizers chapter) to dessert spoons (from the dessert chapter). In other words, hypertext allows you to structure text in many different ways and lets the user maneuver easily through it.

An extended form of hypertext (or hypermedia) can also incorporate pointers to maps, graphs, tables, musical selections or anything else that can be represented or controlled electronically. Some systems control video monitors: Press the right button, and you get a video clip.

Now let's look at Hypercard in this context. Rather than free-form bits of text, outlines and other media, Hypercard uses "cards" as its nodes. Instead of hypertext, you get Hypercard, with pointers between these cards, which are are basically screenfuls of data. These cards can also have fields and can be sorted, indexed and searched by the data in these fields.

Hypercard is a handy system with the direct manipulation powers and intuitive feel of hypertext, yet with the power of a fast, if simple, file manager. You can create and use arbitrary hypertext links, or you can use the file manager to find things not previously linked by hand.

Hypercard offers one more fundamental advantage over hypertext in general (in addition to the rich graphics, Macintosh menus and all the other valuable items I would classify more as texture than a feature): That advantage is programmability.

Hypercard's pointers can be linked to programs as well as to data objects, and there's a language (Hypertalk) for the user to build his own programs, as well as assemble program modules that come with Hypercard.

Thus, you can push a button and run a program, like "Send a letter incorporating the data I have just filled in on this form." The program could then load in the data and generate a form letter. This program could also be copied, with the boilerplate of the letter altered, and attached to another form.

Continued on page 22

Dyson is editor and publisher of "Release 1.0," a leading newsletter about the personal computer business and the transformation of artificial intelligence into a commercial technology. She is also president of New York City-based Edventure Holdings, which publishes "Release 1.0" and holds the annual PC Forum.

Hypercard

CONTINUED FROM PAGE 21

Another program might be a request for someone's name. Hypercard will use that name to search a card file for phone numbers, then automatically dial that number. Hypercard gives the user a sense of power and offers as much programming capability as he is prepared to use. The possibilities are endless.

Indeed, that is the difficulty many people have encountered in describing Hypercard. Because it is so flexible, it has little fixed character of its own. It is strictly a powerful tool with some sample applications thrown in. It can do anything you want — if you think to tell it to.

False profits

CONTINUED FROM PAGE 21

ceived IBM promise.

Making a big thing of a relatively small incident may seem ingenuous; after all, every vendor routinely makes promises that somehow just don't come true. However, it is now more important than ever to look closely at situations such as this one. Tough competition among IBM, Digital Equipment Corp. and others are leading all vendors to lay out fairly detailed long-term strategies and, therefore, implied promises.

Just how heavily should customers depend on — and invest in — their suppliers' long-term directions? Even if the supplier is sincere in its promises, what are the guarantees that market conditions will not force a change in direction, leaving customers holding the bag? Will the assumptions that IBM is building into its mid-range processor strategy still hold true in 1991? How heavily should customers depend on DEC's ability to deliver a 25 to 30 million instructions per second processor in the timeframe at which it has been hinting?

There is a moral to this story.

To customers: All vendors, including IBM, change their strategic directions when market conditions change. In other words, there is no such thing as an iron-clad Statement of Direction.

To vendors: Don't make promises the market might not allow you to keep.

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communication skills as a result of the required business curriculum.

Furthermore, the article in the series' second part stated that many MIS departments prefer to hire computer science graduates for their technical skills. Managerial skills are then taught in-house. To buttress that claim, the article mentioned results from the same survey that indicate 77% of the respondents would hire computer science graduates over liberal arts graduates. My confusion is that MIS business graduates are not liberal arts graduates. Therefore, I do not know if MIS departments prefer to hire computer science graduates over MIS graduates.

I understand that the statistics I would prefer to see are not easy to compile. MIS professionals and educators know that the field is young and its direction unclear. Perceptions vary widely about the optimal technical/managerial mix. This is particularly apparent with the advent of decentralized, end-user initiated computing.

Another objection I have is that the articles seemed to vacillate between undergraduate curriculum and MBA curriculum. Entry-level expectations, salary levels and the value of work experience must be different with educational status.

However, one idea that came through frequently in both articles was that we may be neglecting technical training, particularly mainframe computing skills. Although telecommunications was not mentioned per se, it is probably correct to say that the majority of MIS graduates are not well trained in this area.

The articles also mentioned the importance of work experience either prior to or concurrent with a degree program. I know that my students who lack job experience also lack clout and self-confidence about their abilities. It appears that this is a ripe arena for expanded university-business cooperation in developing internship and co-op programs.

Jill Smith, Ph.D.
Assistant Professor
Management Information Systems
East Texas State University
Commerce, Texas

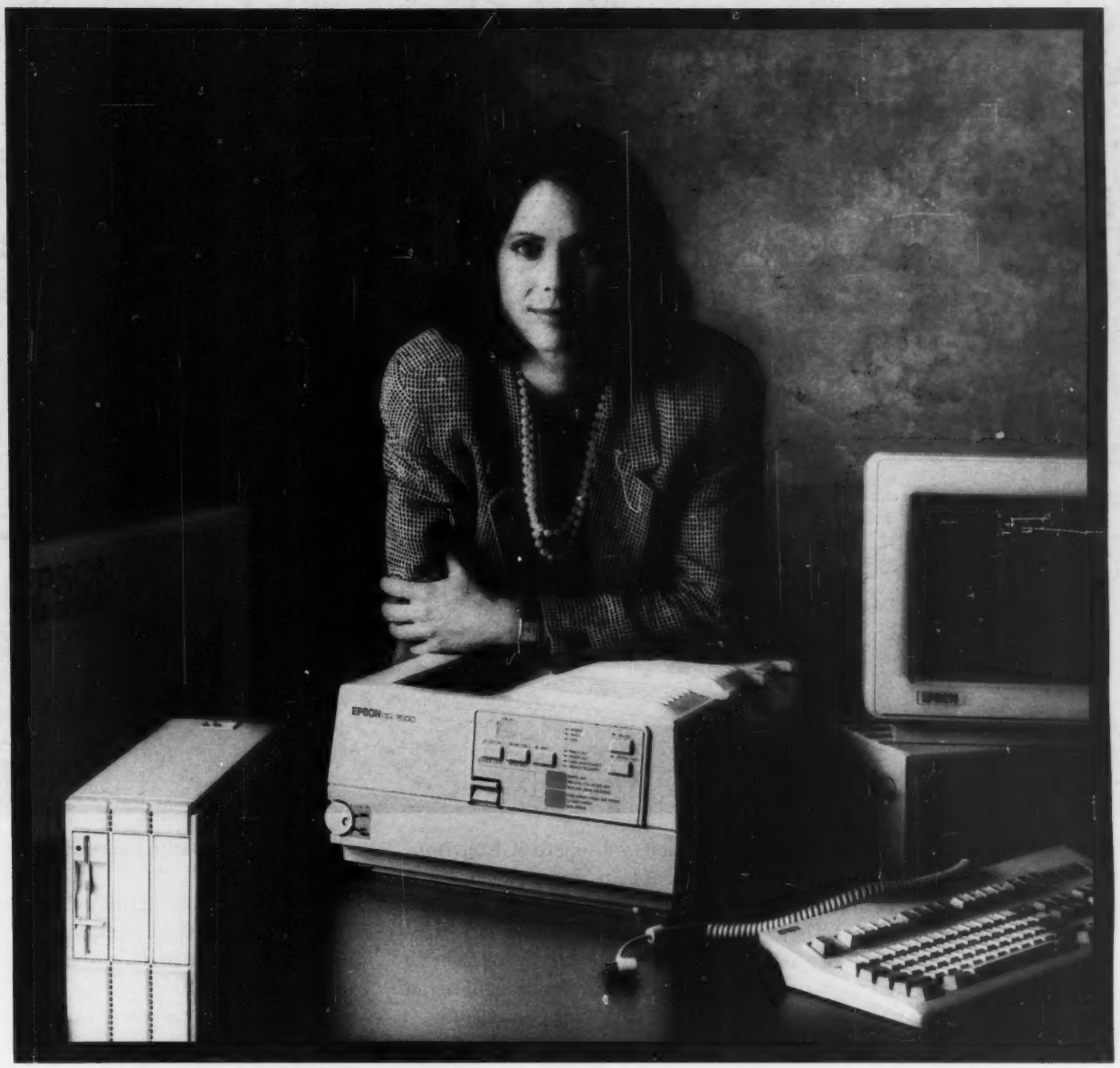
Prove it

I was disappointed that a story about security on one of TRW, Inc.'s on-line systems failed to live up to its headline, "TRW wards off data intruders" [CW Aug. 3]. The story quoted two of TRW's own people who said how good their system was but danced all around the specifics of how it worked and never got around to actually showing what it could really do. Whatever happened to good old-fashioned press skeptisicm?

TRW has recently gone into the business of selling credit reports — which is probably why they are looking for publicity — and it's certainly in the best American tradition for a company to try to generate good press, but could we have a bit more substance, please, and more of a "prove-it" attitude in future efforts of companies to promote themselves?

Art D. Hakenower
Brockton, Mass.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*



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SOFTWARE & SERVICES

SOFT TALK

Charles Babcock

Standards setting pace

In watching the software industry restructure, one is struck by a fundamental change that has crept up without fanfare: the emergence of standards.

At a recent breakfast meeting, an executive of a mainframe software company put his finger on what is different in the industry during the last two years compared with most of its history. "This is the first time that standards are more important than innovation. In the past, standards have always been subverted by innovation," the exec said.

In fact, much of the software industry rests on the standard that was launched in the marketplace in 1964, the IBM 360 processor and its multipurpose operating system. The 360 series grew into the 370 family and helped establish IBM's dominance in the mainframe market.

Having a general-purpose computer rather than devices built for specific tasks was an innovation in 1964 and still provides a clue to the marketplace's standard-setting process. In pole vaulting or broad

Continued on page 36

CASE package goes real-time

Nastec option can reside on LAN, mainframe for multiple access

BY CHARLES BABCOCK
CW STAFF

SOUTHFIELD, Mich. — A computer-aided software engineering (CASE) tool said to allow application developers, real-time system developers and data base administrators to work within the same framework is now available from Nastec Corp.

Nastec, the producer of the widely used CASE 2000 Designaid structured analysis and design tool, has added a real-time option supported by the Designaid data base. The multiuser data base can reside on a local-area network or IBM mainframe where separate teams of developers may access it.

Applications, real-time systems and the data bases that support them are frequently developed by different groups, each following their own procedures and employing different CASE tools. When structured analysis and real-time and data modeling are done in the same data base, the different teams can validate the specifications they are using, Nastec officials claimed.

Graphics tools

The real-time option, priced at $1,500 per copy, provides a systems engineer with the diagramming and graphical tools needed to model a real-time system. In addition to standard data flow symbols, the user has symbols for controllers, event stores, triggers, event flows, continuous data flows and actions.

The diagramming interface provides pop-up menus and a mouse for moving symbols around the screen or changing them, Nastec spokesmen said.

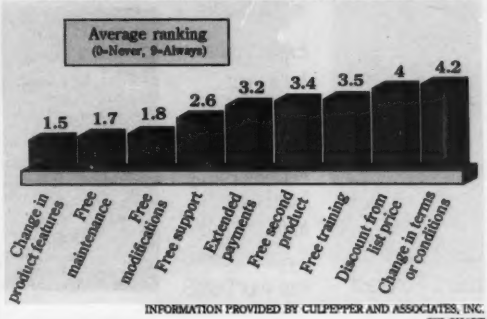
The option can check state-transition diagrams against flow diagrams and verify that events are consistent between them. It can also verify that the same processes are activated in both, according to Clark Keller, Nastec marketing director.

The addition of the real-time option allows developers to model three different views of a system: its processes, through process modeling; its data, through data modeling; and its behavior, using the real-time option, Keller said.

Data View

Contract concessions

Software vendors rank the concessions they yield to customers



INFORMATION PROVIDED BY CULPEPPER AND ASSOCIATES, INC.
CW CHART

BBN releases VAX tool kit

CAMBRIDGE, Mass. — BBN Software Products Corp. recently introduced a programmer's tool kit for creating custom scientific, engineering and manufacturing applications under the company's Digital Equipment Corp. VAX-based RS/1 software system.

Called RPL Programmer's Toolkit, the product runs with RS/1 Release 3.0 on DEC VAX and Microvax systems running DEC's VMS and Ultrix operating systems.

Continued on page 34

System/38 gets SQL interface

BY JEAN S. BOZMAN
CW STAFF

SCHAUMBURG, Ill. — An SQL interface for the IBM System/38's internal data base is being released here by a small firm that used an assembler compiler to gain entry to the closed system.

The product, called Sequel/38, was developed by Advanced Systems Concepts, Inc. (ASC), a 5-year-old firm that has 1,500 of its licensed System/38 packages installed in the U.S. and abroad. ASC claimed it is the only nonprocedural SQL interface to address the System/38's data base built into the System/38 operating system. The data base uses a file format that is different from IBM's DB2 or IMS.

"The System/38 allows you to create a file which is not relational in structure at all," said ASC Vice-President Ira Cohen.

Cohen said it also allows one "to build logical views on it. Our

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Inside

- ANSI panel seeks public comment on SQL addition. Page 32.
- Altai meets competition with expanded job scheduling package. Page 34.
- McDonnell Douglas adds Intelligent 3270 ability to Series 7000. Page 38.

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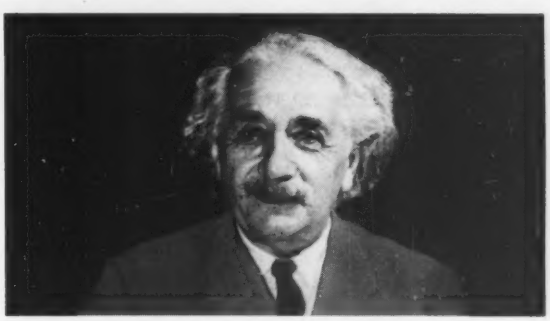

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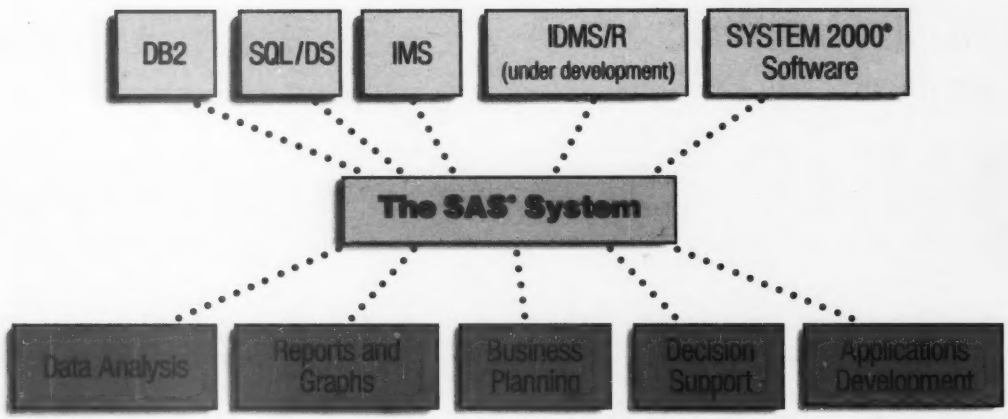

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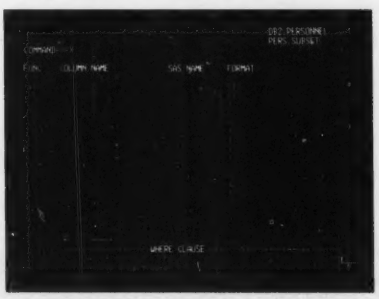

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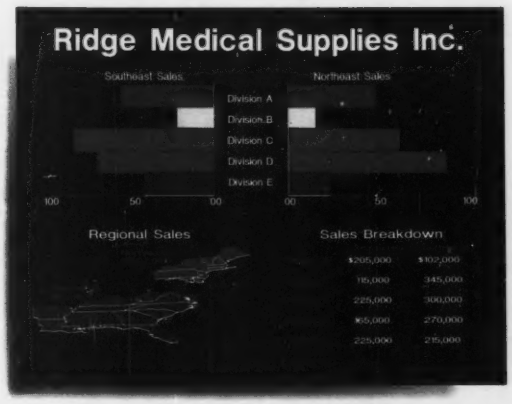

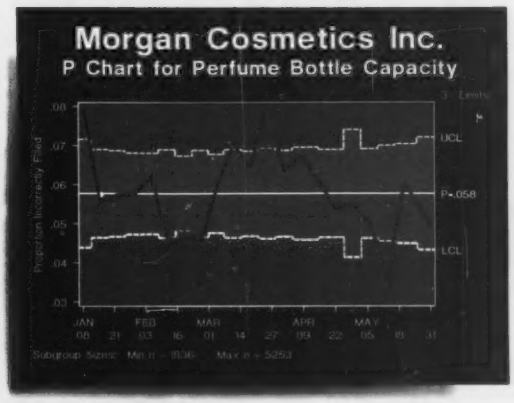

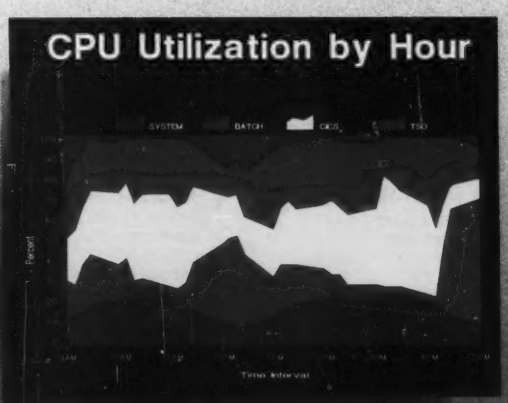

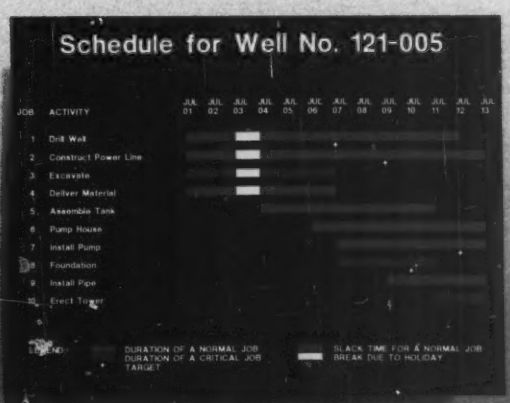

The SAS System runs on IBM Corp.'s 370/30xx/43xx and compatible machines, as well as minicomputers and personal computers.

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SOFTWARE NOTES

IBM names Ferdinand DB2 manager

IBM has named a new DB2 product manager in Santa Teresa, Calif., to replace Marilyn J. Bohl, who resigned in April to join Digital Research, Inc. The newly appointed product manager is **Gary J. Ferdinand.** Ferdinand was formerly the MVS Systems Structure manager with IBM in Poughkeepsie, N.Y.

A story in the Sept. 7 edition of *Computerworld* cited a data base painter for DB2 from **Sage Software, Inc.** The product was described by Sage officials in much the same terms as a data dictionary that governed the application development process. In fact, the product is the enhanced version of a data dictionary developed by **Deere & Co.** in Moline, Ill., and later sold to Sage, according to Deere official Bruce Larson, who spoke recently at a DB2 users' conference in Toronto.

Infodata Systems, Inc. in Falls Church, Va., has signed a joint venture agreement with **Northwestern National Life Insurance Co.** to market a life insurance system that underwriters can use as an on-line reference tool in evaluating insurance policy applications.

Tandem Computers, Inc. has signed an agreement with **Momentum Systems Corp.** in Morris Plains, N.J., formerly Mohawk Data Sciences Corp.'s Systems Division, to jointly market Momentum's Key Base data-entry software. Key Base software allows up to 750 users to share a common data-entry data base.

Digital Equipment Corp. and **Verimation AB** in Rockleigh, N.J., are working on an interface program that would enable users to send electronic mail between DEC's All-In-1 system and Verimation's Memo. The link should be ready by year's end, the companies said. Verimation is jointly owned by **AB Volvo** and **L. M. Ericsson.**

Software Techniques, Inc. in Cypress, Calif., and **UIS Ltd.** in the UK have teamed up to develop and market software utilities for Digital Equipment Corp. VMS systems. The companies say they plan to roll out products for tape and disk management, file tracking and system accounting by year's end.

SPSS, Inc. is reselling **Access Technology, Inc.'s** 20/20 spreadsheet system for mainframes and minicomputers. SPSS claims users of its SPSS-X and SPSS-Tables will be able to pass data to and from 20/20. SPSS also claimed that many users have requested advanced statistical and forecasting capabilities and this system is one way of providing them.

Spokesmen at **SAS Institute, Inc.** in Cary, N.C., say the company's SAS System now runs on the IBM 9370 under VM/SP 4.5 and 5.0 as well as VM/IS and DOS/VSE.

GE Information Services, a division of General Electric Co., recently said it will market and support EDI/36 and EDI/38 electronic data interchange (EDI) software for the IBM System/36 and 38 from **ACS Network Systems** in Concord, Calif. EDI permits the exchange of standard business forms or documents over public teleprocessing networks.

Although the acronym-happy software industry rarely takes inspiration from housewares, **Silden Software** in Encino, Calif., has come up with an IBM System/36 package that has a familiar ring to it. A system that automatically signs off terminals after a preset time lapse during which they have remained idle is called EZoff.

Mainframe security experts Jack Bologna and Charles Varga of **Cossac Associates** in Plym-

Continued on page 34

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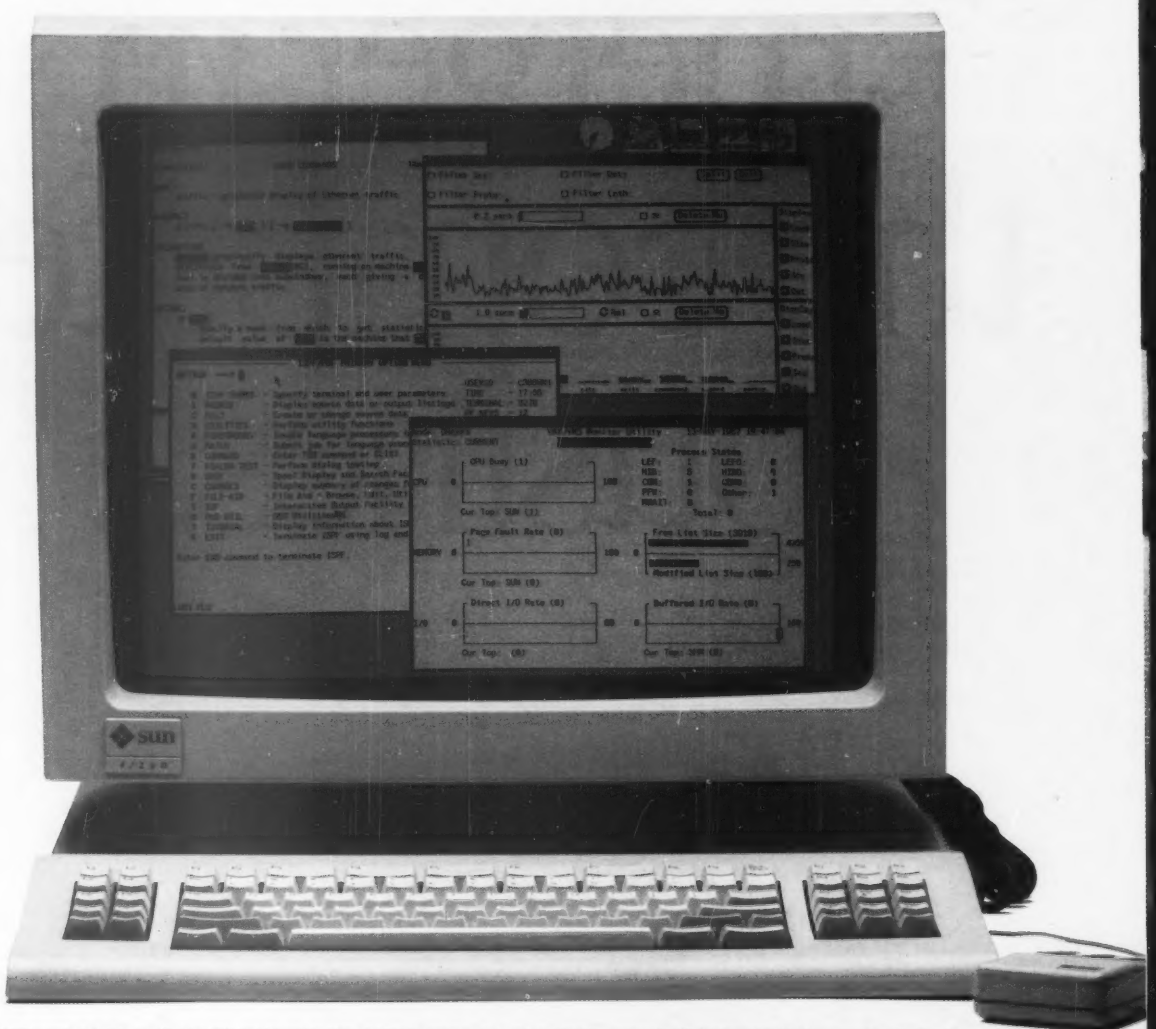

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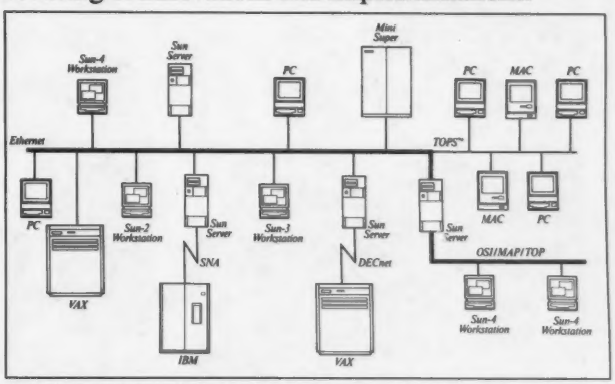

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ANSI seeks public comment on standards additions

BY CHARLES BABCOCK
CW STAFF

WASHINGTON, D.C. — A panel of the American National Standards Institute (ANSI) is seeking public comment on an integrity enhancement feature addition to SQL.

The proposed addendum would offer additional statements in SQL to specify referential constraints between tables without cascade effects and check constraints to be applied to rows of a table. It would also provide a default value for a column when a row is inserted into a table.

Comment is sought on the addendum for a four-month period ending Jan. 11. Copies are available for $25 from Global Engineering Documents, Inc. The proposed addition is designated X3.135.1-198x.

The addendum, if approved by X3, ANSI's accredited standards committee on information processing, would be added to ANSI-standard SQL as approved late last year.

The X3 committee has also announced a review period through Oct. 28 on a generic command set for magnetic tape drives. Changes during the final editing of X3.147-1986, a standard already approved by ANSI, necessitated a second review.

The standard facilitates the development and utilization of tape peripherals on computers by providing a common logical interface. The interface would permit the interconnection of intelligent tape peripherals with different hardware systems.

The standard is intended for use with the Intelligent Peripheral Interface (IPI) Physical Interface and the IPI Device Generic Command Set for Magnetic and Optical Disks, according to Del Shoemaker, chairman of X3T9, the technical committee that proposed the standard. Copies may be obtained from Washington, D.C.-based Global Engineering Documents at $15 each.

Abaqus modified for VAX

PROVIDENCE, R.I. — Hibbitt, Karlsson and Sorensen, Inc. has modified its Abaqus nonlinear analysis software to run on the Digital Equipment Corp. VAX 8300, 8350 and 8800 dual processors.

The dual-processor version of Abaqus can improve speed and performance by 50% to 90% over the standard package, the software vendor claimed.

Abaqus is an application tool designed for computer-aided mechanical engineering users in aerospace, automotive, electronics and major discrete manufacturing industries.

The software package uses finite-element analysis for solving such mechanical engineering problems as heat transfer, dynamic analysis with multiple impacts, soil or rock mechanics analysis and large-strain applications with rubber materials.

Pricing for Abaqus on the VAX 8800 is $1,950 per month. The price of Abaqus on the VAX 8300 and 8350 is $1,500 per month. Monthly charges include all maintenance and software upgrades, according to Hibbitt, Karlsson and Sorensen.

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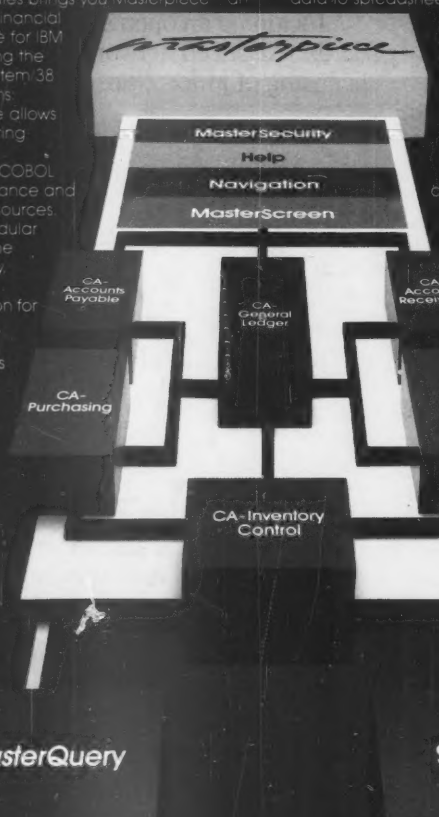

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Altai job scheduler vies for place in market

ARLINGTON, Texas — Altai Software has recently expanded its mainframe job-scheduling utility to include a facility for routing a job to a processor with the smallest work load.

The feature is one of several that the small systems utility firm said it hopes will allow it to compete more effectively with the job scheduling packages offered by Computer Associates International, Inc. in Garden City, N.Y., and Uccel Corp., which is now part of Computer Associates.

Formerly known as Southwest Software, the Arlington-based firm took on the name of its parent company, Altai, Inc., in order to escape a regional association and to market its scheduler, called Zeke, across the country, according to Altai officials.

Pools systems for scheduling

Release 3.3 of Zeke is said to be able to pool real or virtual systems for scheduling purposes and select a system on which to run a job. It can also select a free initiator or partition within the system, preventing one system or part of one system from sitting idle while another is backed up with work, according to Altai President James P. Williams.

Release 3.3 can assess the status of up to 24 systems in a pool, he said.

The updated product also includes enhanced operator and scheduler commands to cross-reference jobs that need to run prior to the latest addition to the schedule. The commands can also submit IBM's JCL to IBM's MVS for syntax checking.

Zekeset available in VSE version

In addition, the Zekeset program, formerly part of the MVS version, is now available in the IBM VSE version. It allows system commands and replies to be embedded in a job stream and allows users to open and close CICS files during the processing of a batch job.

Also, ZekeCMD is a new subroutine that can be called by a user-written program to pass commands directly to Zeke to control or change the system schedule.

The MVS version of Zeke was first introduced in 1985, and the VSE version was introduced in 1982. The company has sold 400 licenses for the product.

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VAX tool kit

CONTINUED FROM PAGE 25

The tool kit, which ranges in price from $2,000 to $10,000 depending on the target VAX model, contains a number of capabilities said to significantly reduce programming time and errors.

Key features include automated procedure editing and loading, runtime profiling, code preprocessing, indexing and cross-referencing and batch loading of group and public procedures. The tool kit also includes a code preprocessor for defining and using macros and for specifying conditional compilation of code.

Modeling, graphics functions

Built around the high-level RPL programming language, the core RS/1 system includes statistical analysis, data management, modeling and graphics functions.

When procedure changes occur, the automated procedure-loading function recognizes the changes and recompiles the procedure, thereby keeping programs up to date, according to BBN Software spokesmen.

Runtime profiling provides call-count and CPU runtime statistics for RPL procedures, reportedly pointing out procedures that may need fine-tuning.

The indexing and cross-referencing utilities are said to aid in automatically creating indexes of application procedures and tables of call dependencies, respectively.

Macros ease coding, maintenance

According to BBN Software, the use of macros simplifies coding and enables easier maintenance. Macros can be defined in separate files and included with one-line commands in the procedure source code file.

With the batch feature, developers can upload finished applications from private accounts to group or public-access accounts for sharing among users.

The tool kit is available now, the vendor said.

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  E-R Approach, Current Status and Future Directions
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CONTINUED FROM PAGE 28

outh, Mich., are offering a computer security program. The program asks 218 true/false or multiple-choice questions about computer security policies and controls. The PC-based program, which will retail for $150, will provide a printed report on how adequate security is at a given installation. It is said to take the place of more expensive mainframe security risk analyses.

Tata Engineering and Locomotive Co. in Pimpri, India, has sent out a letter to software consultants saying it would like to find "well-established software consultancy organizations with specific interest in manufacturing applications." In the letter, the firm says, "We believe we have got a bank of good skills which are in big demand in the USA and which can be easily marketed." The letter came from the office of J. S. Parihar, a division manager with the firm.

Access Technology, Inc. is currently offering its 20/20 spreadsheet for the Sun Microsystems, Inc. workstation environment. The spreadsheet runs under Suntools and operates in multiple Sun windows, Access Technology spokesmen said.

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Standards

FROM PAGE 25

jumping, the standard is set by the athlete who excels at pushing back the limit of human exertion against a single goal.

In the computer industry, standards are set by a less specific and more common-denominator brand of excellence: What is the best general-purpose tool for a variety of users?

IN THE INDUSTRY, standards are set by a less specific and more common-denominator brand of excellence: What is the best general-purpose tool for a variety of users?

Relational data base represents a standard, not only because it has mathematical definition, but also because it offers a combination of flexibility and set-at-a-time processing that was hitherto difficult to achieve. Users may not perceive all the subtleties of the relational model, but they do understand they can more efficiently attack business problems than they could in the past, and the marketplace quickly accepts a new general-purpose standard.

IBM's DB2 has the mainframe share of this market to itself for the moment. But the independent software industry has the means to fight back through SQL, the data access and manipulation language that is now incorporated into an ANSI standard.

The Esvel technology purchased by Cullinet Software, Inc. last year springs from the same relational data base research as DB2, as do Ingres and Oracle from Relational Technology, Inc. and Oracle Corp., respectively. Oracle was the first product to implement SQL, followed by IBM's SQL/DS for the VM and VSE operating systems and then DB2.

Cincom Systems, Inc.'s Supra, with a higher fidelity to the relational model than DB2, offers another alternative. The Esvel technology reportedly meets 11 of the 12 basic rules of the relational data base, the highest rating of any product on the market, according to Paul Hessinger, a DB2 consultant with Computer Task Group, Inc. Hessinger said that rating is unofficial; the official one will have to come from the Codd and Date Consulting Group when it decides to make it public.

More relational products are sure to follow, given the speed of the independent software suppliers once a standard has been set. Perhaps the danger here is not that we will ignore a new standard so much as allow it to become too confining once users start adhering to it.

Babcock is *Computerworld's* senior editor, software & services.

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Interface

FROM PAGE 25

product will allow the user to extract the data from the data base he's created on the System/38."

Sequel/38 is intended for ad hoc queries, based on the idea that it will shorten the backlog of end-user requests. "It could also be used to handle recurring requests for information that should not require the writing of a program," said President Kenneth Kelley.

Written in standard SQL, the product is being shipped now to take advantage of the existing System/38 line, ASC officials said. IBM executives have said that a follow-on machine, codenamed Silverlake, should arrive in the second half of 1988 [CW, Sept. 7]. It took ASC about six months to develop the SQL package, Cohen said.

Sequel/38 will not compose SQL queries that can run on relational systems on other IBM computers, but it will allow a programmer to conduct ad hoc queries to the System/38 data base with the same SQL statements used on the larger IBM machines.

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NEW PRODUCTS

Systems software

An automated SYSOUT management program for IBM's MVS batch-processing environment has been released by **Beta Systems Software, Inc.**

Designed to replace manual SYSOUT handling with on-line access and management, the program, called **Oscar**, allows instant access to output of batch jobs. It provides job log and listing information that the user can customize. Oscar is implemented using the ISPF standard and allows concurrent archiving to two files.

Oscar includes an on-line history index, a browsing feature for viewing output information and a scan facility that identifies character strings.

A permanent license fee for Oscar for a single site costs $18,000.

Beta Systems Software, Suite 1333, 1485 Enea Court, Concord, Calif. 94520.

An enhanced version of the **Omegamon** performance management software said to provide DB2 support for IBM's IMS 2.2 has been announced by **Candle Corp.**

Version 300 for IMS is said to provide DB2 support for IMS's real-time and historical environments. It offers new wait reasons, exceptions and commands that allow users to report on DB2 activity that impacts IMS transactions, including the status of connections between DB2 and IMS and the number of calls to DB2.

Version 300 also offers support for IMS's extended recovery facility, which enables users to define two IMS systems.

Omegamon Version 300 for IMS costs $19,500.

Candle, 1999 Bundy Drive, Los Angeles, Calif. 90025.

McDonnell Douglas Computer Systems Co. has announced **Intelligent 3270** capability on its Series 7000 Integrated Business System, said to allow a local Series 7000 application to be linked to an IBM mainframe application.

Using Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) communications, the feature enables windowing; user-transparent inquiry and retrieval of data base information; use of the user application for monitoring the status of the SNA communication link; and handling of the local presentation and storage of 3270 screens.

A typical small remote job-entry configuration costs $4,255.

McDonnell Douglas, 17481 Red Hill Ave., Irvine, Calif. 92714.

Additional mechanical computer-aided engineering (CAE) software packages for Sun Microsystems, Inc.'s Sun-3 workstations have been announced by **Structural Dynamics Research Corp.**

I-Deas Geodraw is a two-dimensional drafting system. **I-Deas Model Solution** is an on-line solver for linear-static, dynamic and potential flow analysis. This module is integrated with Supertab, the I-Deas finite element modeler. **I-Deas Optimization** is a structural analysis optimization module that automates redesign tasks.

The addition of these products results in two mechanical CAE solution packages — I-Deas for Design is a package for mechanical design engineers, and I-Deas for Analysis is for engineering analysts. The two products cost $16,200 and $10,600, respectively.

I-Deas Geodraw, Optimization and Model Solution cost $3,800, $1,500 and $2,300, respectively.

Structural Dynamics Research, 2000 Eastman Drive, Milford, Ohio 45150.

A product said to assure the integrity of data sets in a single or multiple IBM MVS or MVS/XA operating environment has been introduced by **Duquesne Systems, Inc.**

The **Enhanced Data Set Integrity** verifies that attributes specified in a job's JCL match those in the Data Set Control Block. It also verifies that only authorized utility or application programs open certain data sets.

If two users try to simultaneously open the same data set, the product guarantees that all update operations are serialized and protects the overall integrity of the data set.

Activity statistics such as counts of attribute and utility failures and user conflicts are also available.

Enhanced Data Set Integrity operates in a stand-alone or integrated mode. It costs $3,000 per CPU.

Duquesne Systems, 2 Allegheny Center, Pittsburgh, Pa. 15212.

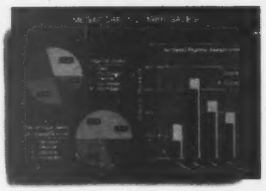
A menu-driven program for on-line queries and reporting has been introduced by **Decision Technology, Inc.**

On-Cue generates and submits a batch job request and returns it to the user. Users can view the output of a report in one window while displaying the request in another. A hard copy can be routed to an available printer. Filled-in screens can be saved in a user library, and security for sensitive data is provided. Users can create columnar report requests.

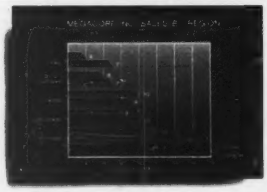
On-Cue is available for use on IBM DOS/VSE and MVS operating systems using CICS or TSO. A VTAM version provides support for more than 200 users in a single MVS space.

Decision Technology, Princeton Corporate Center, 1020 U.S. Rt. 1, Princeton, N.J. 08540.

Executive Assistant. Standalone PC; preformatted graph using Lotus® 1-2-3® data.

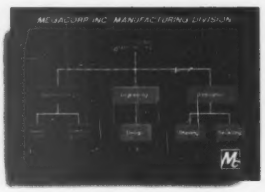


Regional Sales Manager. Departmental mini using data from PC.



National Sales Manager. IBM PC off mainframe; data uploaded from mini.

Corporate Graphics Artist. Created using Editor at graphics workstation.



Vice President of Manufacturing. Departmental mini.

Financial Manager. Remote terminal off mainframe; downloaded ASCII file.

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Applications packages

Computerline, Inc. has ported its **Plantrac** project management software to Digital Equipment Corp. VAX computers running DEC's VMS operating system.

Plantrac/VMS is an integrated critical-path method system that can manage up to 250,000 activities in a project. Each subproject is available for individual analysis. Users may link up to 100 subprojects and allocate across projects. Other features include a graphic module supporting color printing, screen displays and plotting and a report generator.

Plantrac/VMS supports an unlimited number of simultaneous users. It is compatible with other versions of Plantrac.

Plantrac/VMS costs from $2,995 to $6,995.

Computerline, P.O. Box 308, 52 School St., Pembroke, Mass. 02359.

A version of the **Mass-11** word processing software for Digital Equipment Corp. VAX computers, said to support 43 Adobe Systems, Inc. Postscript fonts in an unlimited range of point sizes, has been announced by **Microsystems Engineering Corp.**

Mass-11 Version 7-A allows the fonts to be printed in outline form or in various shades from black to white, the vendor said. Users may change typefaces and point sizes anywhere within a document.

Other features include the ability to convert documents from IBM Displaywrite and IBM 5520 formats; to import spreadsheet work sheets into a document and preserve the cell separations with tab markers; to specify where graphics are to appear on a page; and to search for a 50-char. string.

Prices for Mass-11 range from $5,750 to $17,250.

Microsystems Engineering, Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195.

A software package called **Wiring Diagram Design** has been announced by **Computervision Corp.**

The software allows users to automate the wiring design, engineering and documentation of systems that incorporate both electronic and mechanical elements. It runs on the vendor's Caddstation product family.

The product captures both graphic and nongraphic information of system and features data extract and data merge functions for report generation, the vendor said.

Other features include more than 500 component library symbols, editing functions and the abiity to create parts from portions of a drawing.

The Wiring Diagram Design package is priced at $5,000.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730..

Enhanced integrated plotting packages for IBM mainframes and RT Personal Computers and Digital Equipment Corp. VAXs and Microvaxes have been announced by **Versatec,** a Xerox Corp. company.

Versaplot Random Enhanced 2.1 software features the ability to plot 2,048 line colors and 2,048 area-fill colors per plot. Users can utilize 256 predefined colors or redefine default colors. The software also allows definition of a pixel array with a color associated with each pixel. Raster data from various sources can be merged.

Versatec has also announced Veraplot 9.3 software for its Versacolor thermal-transfer color plotter. The software outputs raster data and was designed for VAX and Microvax computers.

License fees range from $2,000 to $5,500.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

A system of integrated applications for manufacturers and distributors has been developed in Speed II, a fourth-generation language from Tom Software, Inc., by **A&M Data Systems, Inc.**

The system, called **Jcamms,** runs on Wang Laboratories, Inc. VS minicomputers. It combines Speed II with a set of Tom Software's accounting applications and specialized applications. Applications available include accounts payable and receivable, bill of materials, general ledger, sales analysis, purchasing and receiving, production control and payroll.

The modular system features system integration, a parameters file for customizing applications, transaction-control and audit-trail functions, on-line help and security to the field level.

Prices start at $2,000 per application.

A&M Data Systems, 76 N. Broadway, Hicksville, N.Y. 11801.

An enhanced version of **VAX Xway** spreadsheet model and data-conversion application software has been announced by **Digital Equipment Corp.**

Version 1.1 is said to expand the software's capabilities to include support of the latest release of Lotus Development Corp.'s 1-2-3 software and Digital's VAX Decalc Version 3.0 and VAX Decalc-Plus Version 3.0 spreadsheet software.

VAX Xway runs on all VAX computers operating with Version 4.4 or higher of Digital's VMS operating system. It costs $450 for the Vaxstation I system, $1,800 for the Microvax II computer and $10,800 for the VAX 8800 system.

DEC, Maynard, Mass. 01754.

Languages

A shared-memory multiprocessor Common LISP system called **Butterfly LISP** has been announced by **BBN Advanced Computers, Inc.**

The language runs on the vendor's Butterfly parallel processors. It supports Scheme and Common LISP dialects in both interpreted and compiled modes and has been extended to support a multiprocessing environment.

Other features include a performance analysis facility, the ability to use a mouse to point to a thread of control in order to display the source code that created it, graphics display of runtime information about the state of each processor, support for a window-type user interface and the ability to call C language primitives.

Butterfly LISP costs $12,000.

BBN Advanced Computers, 10 Fawcett St., Cambridge, Mass. 02238.

Utilities

Wright EDI, an Electronic Document Interchange (EDI) software package designed to run on IBM's System/36 and 38, has been announced by **Louis A. Wright & Associates, Inc.**

The system contains a communication module that passes information over telephone lines, either by direct dialing or through networks. The translator module converts the information into or out of the EDI standard forms, and the transaction set module defines how the translations are to be done.

Features include the ability to capture and print inbound information and an on-line inquiry capability.

Wright EDI costs $4,000 for the System/36 and $5,000 for the System/38.

Louis A. Wright & Associates, 44567 Pinetree Drive, Plymouth, Mich. 48170.

Two office system administration products for the IBM Distributed Office Support System (Disoss) and Personal Services/370 environment have been announced by **TBS Software, Inc.**

The **Disoss Document Storage Reporter** and the **PS/370 Document Storage Reporter** provide information about documents stored in the Disoss library and the PS/370 pool. The products provide for determination of library storage utilization; information is available about every document stored in Disoss or PS/370.

Single CPU licenses are priced at $1,500 for each product or $2,500 for both.

TBS Software, 28 Viamede Circle, North York, Ontario, Canada M2K 2A8.

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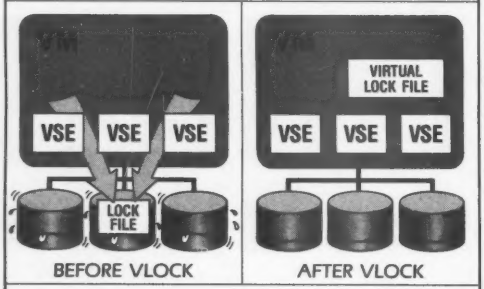

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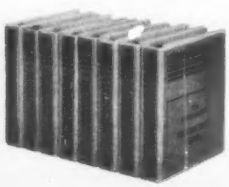

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Software said to enable a user to run IBM's CICS continuously has been announced by **Teltech Corp.**

The **Automatic Dynamic Allocation Management System for CICS** is said to utilize dynamic allocation and deallocation of files and transactions to service on-line and batch program requests without the user terminating and restarting the system.

A permanent license costs $5,000 for IBM MVS operating systems.

Teltech, 39 Broadway, New York, N.Y. 10006.

VSAM/Easy, a tool designed to simplify VSAM access, has been announced by **MB & Associates.**

VSAM/Easy allows users to access VSAM files interactively or in batch mode from a program written in any language, including Cobol, PL/I and assembler as well as Natural language, according to the vendor.

Other features include full access to VSAM and IBM's CICS temporary storage; VSAM read, add, modify and delete; record access by either full or generic key; fixed- or variable-length record support; forward or backward record browse; automatic record positioning; automatic loading into empty files; automatic CICS syncpointing on logged files; and automatic determination of VSAM file and record attributes.

VSAM/Easy costs $9,900.

MB & Associates, Suite 200, 7921 Southpark Plaza, Littleton, Colo. 80120.

A testing and maintenance support tool that automates the management of regression tests has been announced by **Software Research, Inc.**

Software Maintenance and Regression Test Systems (SMARTS) is said to read a user-designed test description file to determine what actions to take for the test or group of tests. Then it issues the prestated actions, runs a difference check on the output against the baseline and accumulates a record of the test results.

In addition to the built-in automatic differencing, there is an "evaluate with user" option for testing interactive products.

SMARTS is available for Unix-based systems as well as IBM Personal Computer- and Microsoft Corp. MS-DOS-based systems. It costs from $475 to $6,750.

Software Research, 625 Third St., San Francisco, Calif. 94107.

An updated version of the IBM DB2 productivity tool, **DB/Pro Edit**, designed to increase productivity by using an IBM Interactive System Productivity Facility (ISPF) editor command format, has been released by the **Updata Software Co.**

DB/Pro Edit Version 2.0 can now create new DB2 indexes. To further simplify the creation of indexes, the updated version allows the user's existing index definitions to be used as templates for new indexes.

According to the vendor, Version 2.0 also enables the user to test SQL SELECT statements with a host of variables via an ISPF edit session.

DB/Pro Edit is available for an annual license fee of $4,500.

Updata, 960 Holmdel Road, Holmdel, N.J. 07733.

A software utility for IBM's Series/1 that was designed to operate the In-Coming Trunk (ICT) Tapesaver tape backup system has been announced by **H&A Computer Products.**

The **Tapesaver Utility** backs up and restores data by volume or by file. Written in Emulation Design Language, the Tapesaver also provides tape maintenance and listing functions to certify and initialize tapes or to create tape and disk directory listings.

No system generation is required for installation. The utility can be run by an operator in interactive menu prompt mode or unattended under batch control.

Features include enhanced file management, automatic file generation and wild-card naming for file referencing.

The company's ICT Tapesaver tape drive system costs $4,600. The Tapesaver Utility software alone costs $490.

H&A Computer Products, 522 Washington St., San Francisco, Calif. 94111.

An enhancement to the Blox/Template User Interface Management System that allows a user to design and test a user interface to an interactive graphics application program has been announced by **Template Graphics Software.**

Using the **Rapid Prototyping Manager** (RPM) enhancement, the designer can define menu, message and work areas; define and locate menus; add text, icons or labels to menus; and define foreground and background colors.

The what-you-see-is-what-you-get, or WYSIWYG, feature allows the user to judge the quality of the interface.

The Blox/Template System runs on all Digital Equipment Corp. VMS, Sun Microsystems, Inc., Masscomp and Silicon Graphics, Inc. computer systems.

The RPM enhancement is included in the cost of Blox/Template 2.0. License costs range from $9,600 to $50,000.

Template, 9645 Scranton Road, San Diego, Calif. 92121.

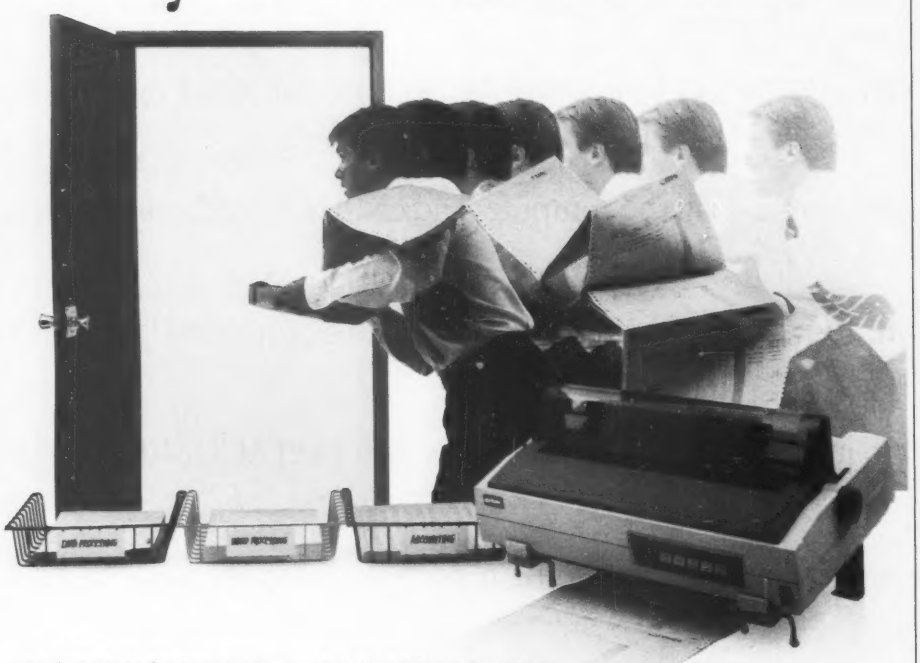
As an enhancement to its VAX Accent R fourth-generation language for Digital Equipment Corp. computers and its relational data base management system, **National Information Systems, Inc.** has introduced **PM Debugger**, a debugging environment.

According to the vendor, program execution can be suspended at 16 break

Continued on page 44

The C-815 Supra 24-pin printer

My life in the fast lane



I used to spend a lot of my time waiting for our old printer to finish cranking out the paperwork for our busy corporation.

But since we bought the C-815 Supra from C. Itoh Digital Products, I never have a moment to spare. I'm living life in the fast lane.

Multi-applications solution

Our department managers love the C-815 Supra. It's like having two printers in one. It prints high volume data processing output, like invoices and spreadsheets, at speeds up to 570 characters per second (cps). And for word processing, the Supra prints sharp, clear, high-speed letter quality at 162 cps.

What really sold our DP/MIS management on the Supra was *Byte Magazine* and *Infoworld* listing the C-815 as the fastest 24-wire printer in their independent tests. And they were right. The Supra's speed and versatility increased our productivity.

Forms expert

Our executives are really impressed with the Supra's dependable, rugged paper handling. It manages continuous forms, labels, letterhead and up to 6-part invoices with its rear or bottom feed paper paths. In addition to its standard pull tractor, the C-815 also features a single-bin automatic sheet feeder that's upgradable to dual bin.

Whether it's high volume spreadsheets and multi-part invoices or letter quality business letters and presentations, the Supra is fast and reliable.

Sound investment

The finance department says the Supra is a great investment since C. Itoh has a long-standing reputation for high quality, durable printers. And because it has built-in emulations for the IBM ProPrinter XL,™ Toshiba P351™ and Qume Sprint 11,™ we don't have to invest in any new systems or software. It works with our new IBM PS/2™ family and such popular software packages as Lotus 1-2-3,™ WordPerfect™ and Chartmaster.™

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Continued from page 42
points; fields can be displayed at each break point to see if values are being set as expected. Up to 16 watch points can also be set.

Program statements can be traced as they are executed. A program can be executed one statement at a time, and the values of fields can be displayed or changed as desired.

Accent R is available for the complete DEC VAX line. Prices range from $4,000 to $99,500.

National Information Systems, Suite 130, 20370 Town Center Lane, Cupertino, Calif. 95014.

A data compression routine for IBM's CICS has been announced by **MacKinney Systems.**

The **CICS/CPR** examines each terminal I/O area for IBM 3270-type devices before data is sent to the terminal and converts all repetitive characters to repeat-to-address order sequences, thereby decreasing response time for remote 3270s and reducing channel contention for locals.

CICS/CPR runs on any release of CICS Version 1.5 and up for DOS, OS or MVS using BTAM or VTAM.

CICS/CPR is priced at $1,295 or $595 for annual lease.

MacKinney Systems, Suite 112, 2674-A S. Glenstone, Springfield, Mo. 65804.

An option that the vendor said can add an automated report distribution system to its SPRI spooling system has been announced by **Software Pursuits, Inc.**

SPRI/Express extracts selected reports and report segments as they are placed in queues and collates them into customized report packages for distribution, according to the vendor.

Sections of the same report can reportedly be placed by the user in any number of distribution packages.

In addition, each package has the ability to be sequenced independently.

Features are said to include a user-constructed distribution table and a multiple-routing capability.

SPRI/Express for the SPRI spooling system runs under DOS/VSE, VSE/SP and the vendor's MVT/VSE operating system.

SPRI/Express costs $200 per month on a two-year lease or $240 per month on a month-to-month basis.

Software Pursuits, Suite 200, 1420 Harbor Bay Pkwy., Alameda, Calif. 94501.

Development tools

Cadre Technologies, Inc. has ported its **Teamwork** product line of computer-aided software engineering (CASE) tools to the Sun Microsystems, Inc. Sun-4/200 workstation series.

Cadre's Teamwork family includes support for the automation of information modeling, real-time systems analysis and systems design phases of the software development life cycle. It also offers a data base and integration tool that allows users to integrate other Sun software development tools with the Teamwork products.

Teamwork products cost from $900 to $7,500.

Cadre Technologies, 222 Richmond St., Providence, R.I. 02903.

A version of the **Smalltalk-80** object-oriented development environment that runs on Sun Microsystems, Inc., Hewlett-Packard Co., Apple Computer, Inc. and Apollo Computer, Inc. workstations has been announced by **Parcplace Systems.**

Smalltalk-80 DE Version 2.2 is said to provide Unix environments with interprocess communication via sockets and access to Unix C shells. On the Apple Macintosh, it provides access to Desk Accessories and provides the ability to cut and paste between the Smalltalk-80 system and the clipboard.

Other features include access to RS-232 ports; support for color displays; 54 type fonts; and access to Adobe Systems, Inc.'s Postscript printing.

Smalltalk-80 costs from $2,995 to $3,995 on Unix workstations and from $695 to $995 on the Macintosh.

Parcplace Systems, 2400 Geng Road, Palo Alto, Calif. 94303.

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A composite material made of graphite epoxy is ideal for use in space because it is stronger than steel yet lighter than aluminum. Unlike metal, it does not expand from exposure to heat or cold, and its reduced weight translates into lower costs and larger payloads. For example, saving just one pound in a space vehicle means a reduced launch cost of several thousand dollars or added fuel for longer operations. Until now, however, graphite composites have proved difficult to mold to shapes more complex than a simple cylinder. But research and development by Hughes has opened the way for the fabrication of a variety of new forms, including tubes with integrated end fittings in a one-piece design, support beams, and ring structures up to seven feet in diameter.

A new software development tool significantly reduced fault locating time for the Hughes APG-70 radar aboard U.S. Air Force F-15E dual role fighters. Unlike previous systems requiring software check-out after the completion of hardware, the Hughes Digital Software Integration Station (DSIS) can test and de-bug software while the hardware is being built, resulting in substantial development cost and schedule savings. Further economies result from the radar's built-in test capability. It has ten times the software and six times as many test targets as its predecessor, the APG-63 radar. The APG-70's increased reliability and maintainability are expected to triple the time between unit replacements.

Galaxy II and INTELSAT satellites are now transmitting U.S. television programming to Japan using a hookup provided by Hughes. NHK, Japan's leading television broadcaster, transmits from its New York studio to Hughes' Brooklyn, New York ground station. The signal is sent to Hughes' Filmore, California ground station via Galaxy II, and then beamed to an INTELSAT satellite over the Pacific Ocean. The signal is then relayed to a Japanese ground station north of Tokyo and fed into the local NHK studio. The daily broadcasts include segments of major U.S. and European news and entertainment programs, plus live on-the-scene reports from NHK bureaus in North America and Europe. Galaxy II is one of three domestic satellites owned and operated by Hughes Communications, Inc., a subsidiary of Hughes.

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SMALL TALK

William Zachmann

Meet the new breed of Unix

As a person dealing with computers in an organization, chances are that it won't be long before you are confronted with Unix, if you haven't been already. While Unix wasn't ready to play the role AT&T cast it for three years ago, this operating system is certainly ready to take its place on the information industry's stage today.

Given that this meeting is almost inevitable, Santa Cruz Operation's (SCO) SCO Xenix 286 System V, as well as a 386 version, may be a manager's first serious look at today's new breed of Unix.

While Unix has suffered from having too many flavors with too few standards, that situation may be changing. An extremely important convergence point on the road to a single standard in the future has been AT&T's Unix System V Interface Definition. A recent milestone in this area has been the convergence between Xenix and Unix System V, Release 3 in the form of, you guessed it, SCO Xenix V for 286- and 386-based systems.

Continued on page 47

Insiders wary of Postscript

Issues of licensing, compatibility, competition come to the fore at show

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Legal questions and compatibility issues in the expanding market for printers compatible with Adobe Systems, Inc. Postscript page-description language (PDL) were key concerns at the recent Seybold Desktop Publishing Conference here.

Postscript has clearly emerged as a standard, and Palo Alto, Calif.-based Adobe has already placed the copyrighted PDL manual in the public domain. However, the company's stand on Postscript-clone vendors — firms that create their own proprietary Postscript interpreters and drivers for laser printers — has left many nervous.

These vendors said they are concerned that Adobe has not been specific enough about licensing elements of Postscript. Although the language is not proprietary, vendors questioned whether Adobe will make any attempt to stop the clones.

In addition, some printer makers were questioning whether Postscript can retain its leadership position in the face of an onslaught of faster language interpreters from U.S. and Japanese companies.

"Adobe has no intention of preventing anyone from writing Postscript interpreters," said Charles M. Geschke, Adobe executive vice-president, in a seminar on Postscript clones. Adobe will offer a royalty-free license to Postscript-compatible vendors, he added, so they can "make use of our copyrighted manual to write software that embodies the list of Postscript commands."

However, Geschke warned vendors regarding the importance of properly licensing type libraries.

"When we started Postscript, we were explicit in our intention to go back to the owners of the trademarks in the type industry and license the use of those names," he said. "That is incredibly important, because they have made tremendous investments and should be compensated."

Geschke added that compatible vendors "should be very careful about not infringing those trademark rights. The end user or the OEM could, in fact, be in an awkward position if that delicate issue is not handled correctly."

In August, Adobe announced a license agreement to develop and manufacture Postscript versions of The Linotype Co.'s Mergenthaler type library, considered to be the premier type library in the industry. The

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Inside

- Micrographx tool copies Clipart images to Microsoft Windows. Page 46.
- Tandy takes on PC heavyweights. Page 49.
- Northern Computer Systems releases 386-based 32-bit workstation. Page 52.

Data View

PC world market
1986 Vendor shares in units shipped

IBM	22%
Apple Computer, Inc.	14%
Tandy Corp.	8%
Compaq Computer Corp.	3%
Hewlett-Packard Co.	3%
Leading Edge Hardware Products, Inc.	2%
Zenith Data Systems	2%
AT&T	2%
Others	44%

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.

CEO cites Tandy line's business value

In his six years as Tandy Corp.'s chief executive, John Roach has established a reputation as an outspoken member of the computer industry. The plain-speaking Texan came to Tandy 20 years ago to manage its data processing business. Rising steadily, he took over the company's top slot after the death of its founder Charles Tandy in 1978.

The 48-year-old Roach eschews some of the trappings of the typical chief executive, preferring to answer his own phone, eat in the Tandy cafeteria and drive an American-made car. To mark Tandy's 10th anniversary in the microcomputer market,

John Roach

Roach recently spoke with *Computerworld* correspondent Julie Pitta regarding the company's efforts to move into the business arena (see story page 49) and the challenges Tandy will face during the next 10 years.

How important is the Fortune 500 market for Tandy? How do you plan to penetrate that market?

The Fortune 500 market for us, unlike certain other manufacturers, is just another important segment of the market for Tandy and not the most important segment. We address it both through our Computer Centers and our outbound sales force, which addresses all business markets and not just the Fortune

Continued on page 48

VS COBOL Workbench with CICS Option is the Optimum Environment for Creating CICS Applications

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Rediscovering 2-year-old 1-2-3 compiler

BY DOUGLAS BARNEY
CW STAFF

CHICAGO — While the notion of a compiler that works with Lotus Development Corp.'s 1-2-3 gained attention this summer with the annoucement of @Liberty from Softlogic Solutions, Inc., an existing product was almost overlooked.

Baler, a $495 1-2-3 compiler from Brubaker Software in Lafayette, Ind., has been on the market for two years. Dave Butler, manager of financial systems for Follet College Bookstores, a divison of Follet Corp. here, has been using the package for a year and said he has saved money and avoided headaches in the process.

Spreadsheet compilers allow managers to develop specific models and distribute them to end users at little cost. This approach provides a model to users that cannot be modified. The end users, however, are still able to fill work sheets with data they need to analyze.

The inability of end users to modify a distributed model is handy for their managers. "It gives you some security," Butler said. "You can limit applications to only what you want."

Follet's model involves balancing checks for auditing. "The inability for end users to modify it gives our auditors a lot of comfort," Butler said. The model was essentially "designed to allow the transmission of cash register information to the corporate office for keypunch into the corporate ledger on a mainframe," Butler explained. Data integrity is key for such an application.

Another reason for Follet to go with Baler was purely economic. "We have a lot of small branch units, and we could not justify a spreadsheet for each store," Butler said. So far, Butler has distributed some 20 copies of the model to the firm's college bookstores around the country. The plan eventually calls for 60 copies of the model to be in place.

According to Butler, compiling a spreadsheet with Baler was easy. "They have a lot of compiling routines in batch routines. You don't need programming experience," he said.

But perhaps the most important advantage is that bookstore clerks can use a compiled spreadsheet more easily than developing a model.

"The people in the stores don't have the ability to create a model," Butler said. A compiled spreadsheet also requires less memory than the full version of Lotus's 1-2-3, he added.

Compiled spreadsheets are now an essential part of the Follet College Bookstores' operation and fulfill a need that Lotus's 1-2-3 would be unable to fill. "If we didn't have this, we would have had a custom program written. We would not have bought Lotus," Butler said.

Softlogic's @Liberty sells for $100 and allows for up to 10 compiled spreadsheets to be distributed.

Program draws Clipart images on Windows

RICHARDSON, Texas — Micrografx, Inc. has introduced a program compatible with Microsoft Corp.'s Windows that allows users to select and copy Micrografx's Clipart images to the Windows Clipboard.

Christened Portfolio, the program is bundled with a pictorial index of Micrografx's Clipart, along with suggestions on how to best use it.

Portfolio has a suggested retail price of $99.95 and includes the company's General Library and a coupon for one free Clipart library.

The company also unveiled a Holiday Clipart Library that users can incorporate into holiday correspondence, newsletters and other types of publications, according to a company spokesman.

The color images of the Holiday Clipart Library are object-based. They are compatible with Adobe Systems, Inc.'s Postscript, a popular page-description language, and best-selling applications such as Aldus Corp.'s Pagemaker and Autocad from Autodesk, Inc.

The images are also compatible with Micrografx's In a Vision and Draw graphics programs.

Each image in the series was handcrafted by professional artists using Micrografx's lastest spline-curve technology. Users can access this technology through the company's Custom Clipart Service.

There are several hundred images included in the Holiday Clipart collection, including artwork for each major U.S. holiday. Images are included for Thanksgiving, Christmas, New Year's, Easter, Memorial Day, the Fourth of July, Labor Day and Halloween.

Besides the Holiday Clipart library, Micrografx offers 10 other Clipart libraries, including Maps, Computers and Office, Signs, Flags, Space and Astrology, Architectural and Chemical, the company said.

Holiday Clipart carries a retail price of $49.95.

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That's 500 sheets more than most other laser printers.
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What's more, our optional proprietary envelope feeder lets you print large quantities of envelopes without constantly banging away on your office typewriter.
You can also use the same font style that appears on your letters to create a

New breed

CONTINUED FROM PAGE 45

The result of a cooperative agreement between SCO and Microsoft Corp., SCO Xenix 286 and SCO Xenix 386 are presently available directly from SCO as well as through system vendors serving as OEMs, such as Compaq Computer Corp., Wyse Technology, Zenith Data Systems, Ing. C. Olivetti & Co. and Texas Instruments, Inc.

SCO Xenix 286 and 386 are Unix System V, Release 3-licensed versions of Xenix that conform to the Unix System V Interface Definition.

The 286-based version is priced at $595 for the operating system, $595 for the development system and $195 for a basic text-processing system. The combined basic system is also available, for a list price of $1,295. For the 386-based version, prices are $695 for the operating system, $695 for the development system, $195 for the text-processing system and $1,495 for the whole kit and kaboodle. The software will run on most IBM Personal Computer AT-compatible 286- and 386-based systems.

I have worked with SCO Xenix 286 Version 2.2 for several weeks on a 386-based system from PC's Limited without any difficulty. SCO Xenix has proved to be a reliable operating system. It offers an excellent low-cost opportunity to get back up to speed on the current state of Unix.

Even more important, it offers an immediate solution for people who want to turn 286- and 386-based personal computers into multiuser work horses for practical applications. There's little wonder why many value-added resellers targeting small businesses and departmental applications on PC platforms have turned to SCO Xenix .

Xenix vs. OS/2

It has been particularly interesting to contrast SCO Xenix with the prerelease version of Microsoft's MS OS/2 provided with the OS/2 System Developer's Kit. Even a little experience with the two systems is enough to show that both will have their place in corporate use.

SCO Xenix is clearly the operating system of choice when more traditional, multiuser, multiterminal configurations are desired. It will have clear advantages when it is desirable to use existing software written for the Unix environment.

OS/2, however, has obvious advantages as a single-user environment. Its task-management strategies and priority algorithms are optimized for the single-user, multitasking model. OS/2 will also be a very attractive operating system for transaction-oriented network servers, especially when high-level interaction is important between workstation and server processes. What's more, although more complex than MS-DOS or IBM's PC-DOS, OS/2 is less complex to use than Unix. On the other hand, OS/2 still isn't ready for general release, but SCO Xenix V is currently shipping.

Its ability to effectively tap the minicomputer-like power of 386-based systems selling at microcomputer prices makes SCO Xenix an extremely valuable tool for organizations concerned with getting the most value per dollar for computing resources. The result is likely to be a lot of software like SCO Xenix finding a home in corporate America.

Zachmann is vice-president of research at International Data Corp.

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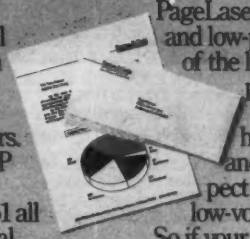

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Toshiba America, Inc., Information Systems Division

Postscript

CONTINUED FROM PAGE 45

agreement expands Linotype's type library with Postscript fonts and ensures that Linotype will only sell the Postscript version of its library to Adobe licensees, thereby enabling Adobe to tighten its grip controlling the encroachment of clones.

Aside from legal issues, clone vendors must offer compatibility, increased performance and expandability to accept standards other than those offered by Postscript. There are concerns that Japanese standards might be widely adopted in the future and could either coexist with or overrule Postscript's placement in the market.

"It's clear that Postscript has won the battle for now," said Bill Hilliard, product manager for Phoenix Technologies Ltd. in Norwood, Mass. "But it could become the Apple II of PDLs. It may go on forever, but something else might come along in the future to take away its position."

In Japan, there are three different PDL character code standards, all of which are faster than Postscript. As a result, it is not clear which standard might ultimately be accepted on a national or international basis, Hilliard added.

Already, some vendors are developing bilingual PDLs to ensure wider compatibility. Control-C Software, Inc. in Portland, Ore., announced at the conference that its Postscript-compatible language would also support Interpress, Xerox Corp.'s language.

Most important in playing the Postscript-compatibility game is being compatible with Apple Computer, Inc.'s Laserwriter printer, which is the largest customer for Adobe's Postscript thus far.

"You have to behave the same as Laserwriter, in the long run," said Andy Johnson-Laird, chairman of Control-C. "If you don't, Aldus Corp. [developer of Pagemaker] will get irritated or the end users will. Postscript should remain invisible to most end users, and most users will need compatibility with the Laserwriter."

Tandy line's value

FROM PAGE 45

500. We also have regional marketing people that are also focused exclusively on the Fortune 500.

Why should MIS directors buy Tandy equipment?

They should believe our advertising claim that there is no better value in the marketplace. I think Tandy's challenge is to convince the MIS director that we sell fine quality machines at the most affordable prices in the market today. The average MIS director doesn't know that.

What are your goals for selling to MIS in large corporations?

Our market share is small — in the few-percent range. We would be very pleased to double that in the next year. That would be significant business for us and would mean that we've made significant inroads.

How important is it for you to clone IBM's Micro Channel? How will you answer IBM's Personal System/2?

I think every new piece of hardware that comes into the market, regardless of the manufacturer, has features that the whole industry reviews and has to determine the importance of for the long term. Of course, customers themselves have an important vote as well. The Micro Channel, as well as VGA [IBM's Video Graphics Array], are things that we will seriously consider. In fact, VGA is an option on our 386-based machines today.

As far as the whole bus structure question is concerned, when you look at the next generation of operating environments, the applications software that runs on those machines is essentially hardware-independent and, as a result, doesn't know what kind of bus that it's dealing with. The real significance of that is that all manufacturers now have the ability to bring some real innovations to hardware design as long as the operating environment is compatible with it and the software is compatible with it. It's not clear what you can do with the Micro Channel that you can't do with another bus structure.

Will IBM's OS/2 Extended Edition run on Tandy systems? Does it matter?

The answer to the question of OS/2 Extended has not seen the light of day. The rumor is that it needs an exceptionally large amount of memory to handle all these extended functions. IBM's literature says OS/2 Extended will run on the Intel 286-based PC XT and AT machines. So, if you believe their literature, it would appear to run on all other machines as well. There is some question as to whether the user will readily devote that level of overhead for [OS/2 Extended's] memory requirements. I think OS/2 Extended is a two- or three-years-out type of issue. Anyone who focuses on it is the ultimate victim of fear, uncertainty and doubt.

Does it matter [that OS/2 Extended run on Tandy systems]? I'm not sure, but it probably does.

Why didn't Tandy move to full Microsoft Corp. MS-DOS compatibility sooner? How badly were you harmed by that decision?

While it can be argued that we were a little slow in having full [personal computer] compatibility, when we did introduce it in November 1984, we did it in a significant way. We were anything but a hardware clone. We had better graphics, we had sound, we had a smaller footprint, we had more application-specific integrated circuits.

In effect, while we offered interface compatibility, our machines were higher tech and more reliable than those common in the market at that time. Because of our history, it did probably take us a little longer to achieve full compatibility than we might have [otherwise]. But our sales have been very robust. I can't say that it didn't harm us back in 1984, but today, it's a [whole] new ball game.

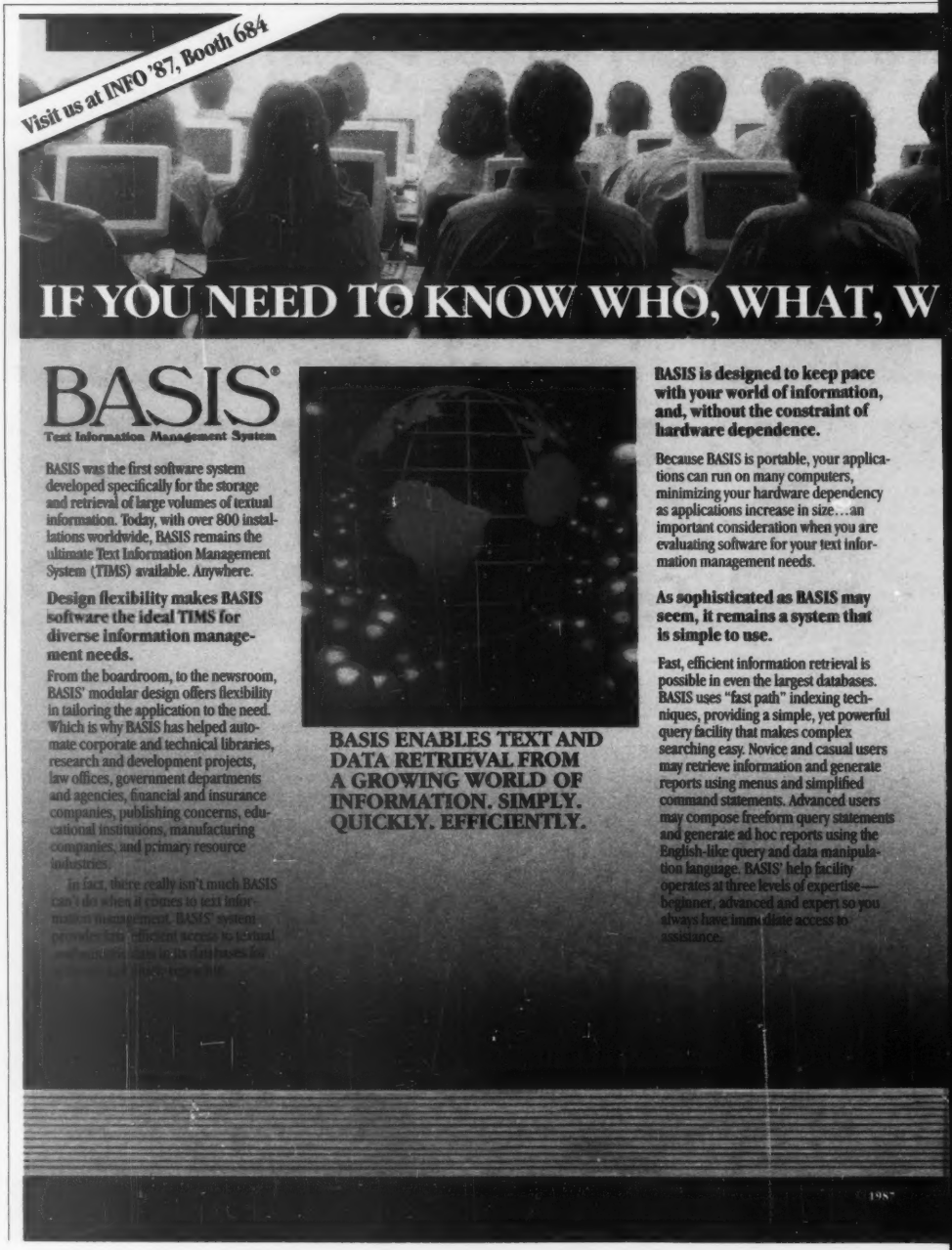
What have been Tandy's most important accomplishments during the last 10 years? What do you hope to accomplish during the next 10?

In the microcomputer area, our No. 1 accomplishment was making microcomputers nationally available. One of the more interesting things that we did next was our barnstorming campaign in 1978 and 1979. We rented hotel rooms around the country and invited the general public in to see a microcomputer and touch a microcomputer and to see that no one had ever been injured using one. We also made significant inroads in the education market. We gave free computer-literacy training to 400,000 school teachers. Also, we transitioned into the MS-DOS world, offering machines that were compatible — but not clones — by adding value with features and software.

The next 10 years will probably be more interesting than the last 10. It's getting to be a significant-size business. With all the advances being made in hardware and software, the end user is going to be the big beneficiary. We think with our design capability and with our low-cost manufacturing capability, we'll be a viable competitor.

What's the most important thing you've learned during the last 10 years?

Longevity and being a survivor is as important as anything. We've seen a lot of friends come and go.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1987

PC push ends Tandy's small-potatoes image

Trumpets IBM-compatible line, sheds 'Radio Shack image' to compete with heavyweights

BY JULIE PITTA
CW STAFF

Once known as a microcomputer supplier for home and small-office use, Tandy Corp. is garnering the attention of cost-conscious corporate buyers with its line of IBM-compatible personal computers.

"They offer compatibility at a competitive price from a name-brand vendor," said Bill Lempesis, an industry analyst for Dataquest, Inc. in San Jose, Calif.

"They can compete in the corporate market based on their pricing," he added.

Lempesis said Tandy is taking the proper steps to become a viable supplier to large businesses and that it revamped its "Radio Shack image" last January by adding a direct sales force to address major accounts.

Didn't get no respect

"For a while, they were the Rodney Dangerfield of computing," Lempesis conceded. "They didn't get respect from large businesses. But they've put in place a framework to sell to business. They've added three-piece suits, and they've become a little more professional."

So far, Tandy has made only modest inroads in the business arena. In 1986, the firm shipped 3.4 million microcomputers to small and large businesses, about 5.5% of that market. That placed Tandy in fifth place behind IBM, Apple Computer, Inc., Compaq Computer Corp. and AT&T.

Lempesis said he expects Tandy to increase its share of the market with its new emphasis on the large-business buyer.

Once an IBM-only shop, Wells Fargo Bank NA has opted to use Tandy for its microcomputer needs. James Saavedra, senior vice-president and manager of Wells Fargo's wholesale loan services division, said the bank evaluated low-end systems from IBM, AT&T and Compaq before choosing Tandy.

Looking for dispersed support

"We were looking for a major vendor that could support a large corporate installation in a variety of locations," Saavedra said. "Tandy came out the winner."

Wells Fargo will use Tandy's Intel Corp. 80286- and 80386-based microcomputers in 50 commercial lending offices scattered throughout California, as well as in Dallas, New York, Atlanta and Chicago. Saavedra said Wells Fargo was drawn to Tandy because of its ability to provide on-site service.

The Tandy microcomputers will be used as nodes in local-area networks and linked via an IBM Systems Network Architecture gateway to IBM mainframes. Account officers will use the Tandy microcomputers to access customer information and to perform financial and credit analysis.

Saavedra said he expects to have between 300 and 500 Tandy systems by early 1988, replacing and augmenting Wells Fargo's existing IBM Personal Computer XTs and ATs.

"Based on price and performance, we think they've offered us the best option for what we're trying to do," Saavedra said.

GE makes the switch

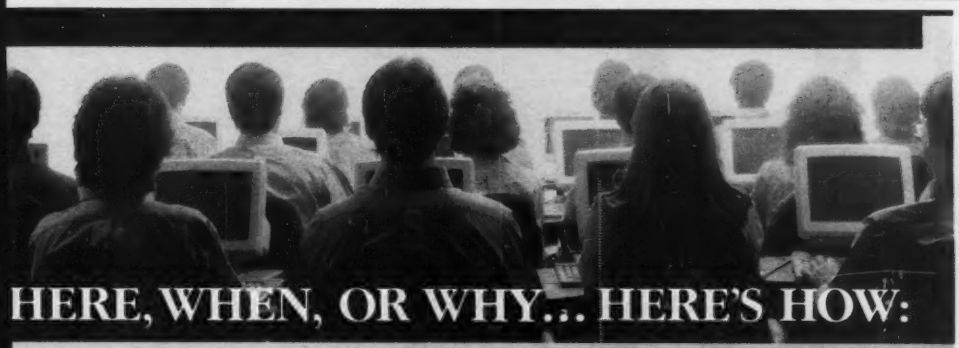
General Electric Co. has also recommended Tandy systems as the IBM-compatible microcomputer of choice for its 200 to 300 subsidiaries.

Previously, GE had selected Leading Edge Hardware Products, Inc. as its vendor for IBM compatibles. However, GE switched to Tandy about six months ago because it offered a broader line of products.

Jeff Ehrlich, director of product technology for GE's Corporation Information Technology group in Bridgeport, Conn., which is responsible for buying recommendations, said Tandy offered GE the right combination of pricing, performance, service and support plus the ability to deal with a large corporation.

"A lot of companies may have price and performance and even decent service and support, but they can't do business with a company the size of General Electric," Ehrlich explained. "They can't do a billing, they can't do a bid or draw up a purchase agreement. If we're going to do a corporate deal, we have to be able to do business with the vendor."

Ehrlich said GE will use Tandy PCs in "every application imaginable." Currently, there are "hundreds of Tandys" scattered throughout GE companies, and hundreds more will be purchased through the year, he added.



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People who really know computers have just ranked Digital #1 in linking desktops to mainframes.

information from any file on any VAX™ computer. And what's so unique about Digital's local area network is that it's the same regardless of the number of users – workgroups of 10, departments of 500 or organizations of thousands.

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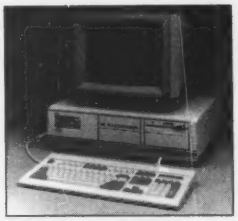
NEW PRODUCTS

Systems

NEC Information Systems, Inc. has introduced the **Powermate 386** personal computer based on the Intel Corp. 80386 chip.

The Powermate 386 includes a processing unit with 1M byte of random-access memory, a 1.2M-byte floppy disk drive, a 40M-byte hard disk drive and a keyboard. It can accommodate five 5¼-in. internal disk storage devices and has eight full-size expansion slots, two RS-232C serial ports and one parallel port.



NEC's *Powermate 386*

Available options include NEC's Multisync 14-in. display monitor and three graphics boards.

The Powermate 386 is priced from $5,095.

NEC Information Systems, 1414 Massachusetts Ave., Boxboro, Mass. 01719.

A 32-bit workstation that runs under AT&T's Unix System V, Release 3 or Microsoft Corp.'s MS-DOS 3.2 operating system has been announced by **Mad Intelligent Systems, Inc.**

Based on the Intel Corp. 80386 microprocessor, the **D3000** workstation runs with a 16-MHz clock. The Unix workstation features 4M bytes of memory; a 1.2M-byte, 5¼-in. floppy disk drive; two serial and two parallel ports, the vendor's Advanced Graphics Controller; a keyboard; a mouse and Unix System V, Release 3 with the Xwindows system.

Options on the product include a choice of a 44M-, 72M- or 140M-byte hard disk drive and a 16- or 19-in. red-green-blue color monitor or 19-in. high-resolution monochrome monitor, the vendor said.

Prices start at $5,000.

Mad, 2950 Zanker Road, San Jose, Calif. 95134.

A turnkey desktop publishing package called the **CPT Integrated Desktop Publishing System** has been introduced by **CPT Corp.**

The system is based on the CPT 9000 IBM Personal Computer AT-compatible workstation. Also included are a mouse, a scanner, a laser printer, Microsoft Corp. MS-DOS and Xerox Corp.'s Desktop Publishing Series' Ventura Edition, developed by Ventura Software, Inc.

According to the vendor, MS-DOS applications can run concurrently with CPT's text-processing software.

Features include both 5¼- and 3½-in. disk drives as well as a 20M- or 40M-byte hard disk drive.

Prices for the Integrated Desktop Publishing System range from $10,400 to $12,500.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

The **Acer 1100** business computer, based on the Intel Corp. 80386, has been announced by **Northern Computer Systems.**

The Acer 1100 32-bit system runs at 16 MHz. The base system includes 1M byte of random-access memory, one 40M-byte hard drive, one 1.2M-byte floppy drive, two serial and one parallel port, eight expansion slots and a 101-key enhanced keyboard. Options include color and monochrome graphics adapters

What's the NEW Score in Distributed Matrix Switching?

		Data Switch	Other
1	Does the vendor offer a true *distributed* matrix switch (versus an electronic patch panel)?	Yes	
2	Is the distributed switch fully operational at the maximum announced matrix size when all satellite switches are attached?	Yes	
3	Are there any documented problems with the control software, resulting in inability to control the switch?	No	
4	Are systems being delivered to customers as promised, or have shipments been delayed?	Yes—on time	
5	How many latest-generation distributed switches have been shipped to customer sites?	200+	
6	Can references be contacted, with sites visited?	Yes	
7	How large is the vendor's in-house service organization?	75	
8	Is local customer service available from vendor's in-house organization?	Yes	
9	Is performance monitoring integrated in the distributed matrix switch?	Yes	
10	How much distance does the switch allow between DTE and DCE?	800'	
11	Does the switch provide V.35 support with no sacrifice in RS-232 ports?	Yes	

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and monitors.

The Acer 1100 is priced from $3,995.

Northern Computer, 14960 Martin Drive, Eden Prairie, Minn. 55344.

The **Ivy Portable 386 Series** of IBM-compatible microcomputers, which uses the Intel Corp. 80386 16 MHz 32-bit microchip, has been announced by **Ivy Microcomputer Corp.**

The Ivy 386 portables are said to run the Unix 386 operating system. The Model 40 features a 1.2M-byte floppy drive, a 40M-byte hard drive, 1M byte of random-access memory on an eight-slot motherboard, a 9-in. amber display with Hercules Computer Technology, Inc.-compatible graphics adapter card, a parallel port and an IBM Personal Computer AT-style keyboard.

The Model 80 features an 80M-byte hard drive, and the Model 130 features a 130M-byte hard drive instead of the 40M-byte drive.

The Model 40 costs $3,495; the Model 80 costs $3,995; and the Model 130 costs $5,495.

Ivy Microcomputer, 15 Ararat St., Worcester, Mass. 01606.

Software applications packages

An entry-level computer-aided drafting and design program called **Cub** has been announced by **Innovative Computer Aided Technology, Inc.** (ICAT).

The two-dimensional product, designed for use on IBM Personal Computers and compatibles, features double-work parametric mathematical calculation; automatic associative dimensioning; multiple pick-and-reject operation; detail-transfer capability from another drawing or standard library; window pan and zoom at any time; standard library-creation capability; automatic isometric view generation; and overlay of drawing.

Cub is priced at $2,500. As a turnkey package with an IBM PC AT compatible, a match coprocessor, a 20M-byte hard disk, an enhanced graphics adapter display and software, it costs $6,595.

ICAT, Suite 2, 14979 Prairie Ave., Lawndale, Calif. 90260.

An enhanced version of **Borland International's** relational data base management system software designed for the Apple Computer, Inc. Macintosh has been introduced.

Reflex Plus is said to feature predefined software templates, a choice of an entry form showing either one record at a time or all records at once in a tabluar view format and 55 built-in functions. Entry forms are said to support calculated fields and to automatically perform mathematical calculations during data entry. Users can select record sizes of 1,000, 2,000 or 4,000 char.

Reflex Plus is priced at $279.

Borland, 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

Software said to provide a simulation capability for modeling manufacturing systems has been announced by **Pritsker & Associates, Inc.**

Xcell+ combines computer graphics and an interactive menu-driven model builder to allow construction of simulation models and animation simultaneously. It offers fill-in-the-blank data entry and on-line Help as well as built-in manufacturing constructs and such output reports as work-in-process inventory cost and workstation utilization.

Xcell+ runs on IBM Personal Computer ATs, Hewlett-Packard Co. Vectras and compatibles. It costs $8,000. A limited version with black-and-white graphics is available for $4,000.

Pritsker & Associates, P.O. Box 2413, 1305 Cumberland Ave., W. Lafayette, Ind. 47906.

Response, an integrated contingency planning system for data processing and corporate disaster recovery planning, has been announced by **Mosaic Computer Security, Inc.**

Response, which runs on IBM Personal Computers or compatibles, includes facilities for determining critical applications, calculating off-site storage requirements, defining team procedures and generating relevant documentation.

Features include customized templates for data entry, file encryption, micro-to-mainframe communications and an automated maintenance program.

Response is priced at $12,000 per site.

Mosaic, 1982 Massachusetts Ave., Cambridge, Mass. 02140.

Software languages

VCL, an implementation of Digital Equipment Corp.'s VAX/VMS command language designed for Microsoft Corp. MS-DOS and Unix-based systems, has been announced by **Boston Business Computing, Ltd.**

VCL features DEC DCL commands and switches, DCL syntax, an extensible command set, logicals, symbol names, command history and line editing. It also offers a Teach mode said to display the equivalent MS-DOS or Unix command for every DCL command entered.

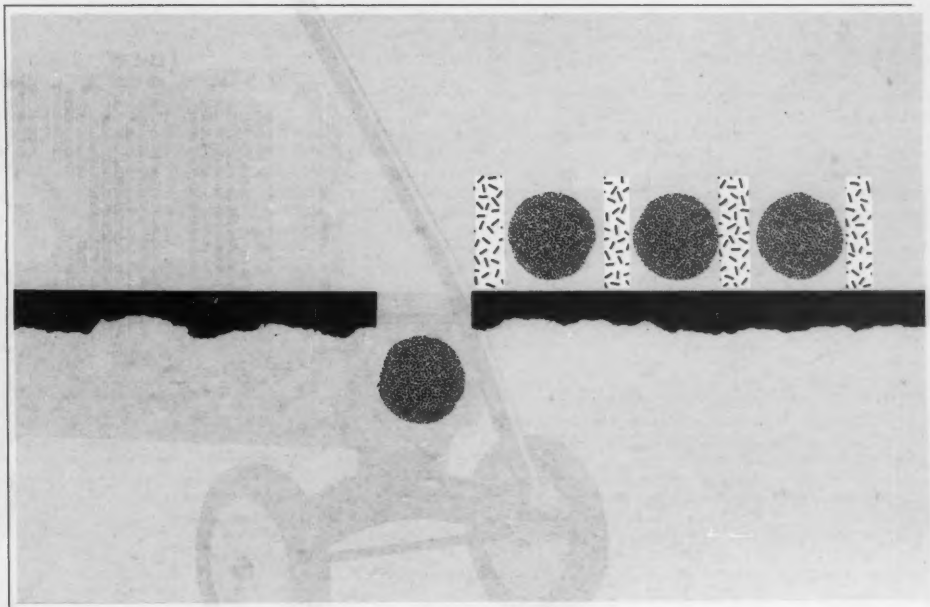
VCL is priced at $195.

Boston Business Computing, Riverwalk Center, 360 Merrimack St., Lawrence, Mass. 01843.

Software utilities

Two utility subsystems that generate IBM's Message Format Service (MFS) and Basic Mapping Support (BMS) screen

Continued on page 55



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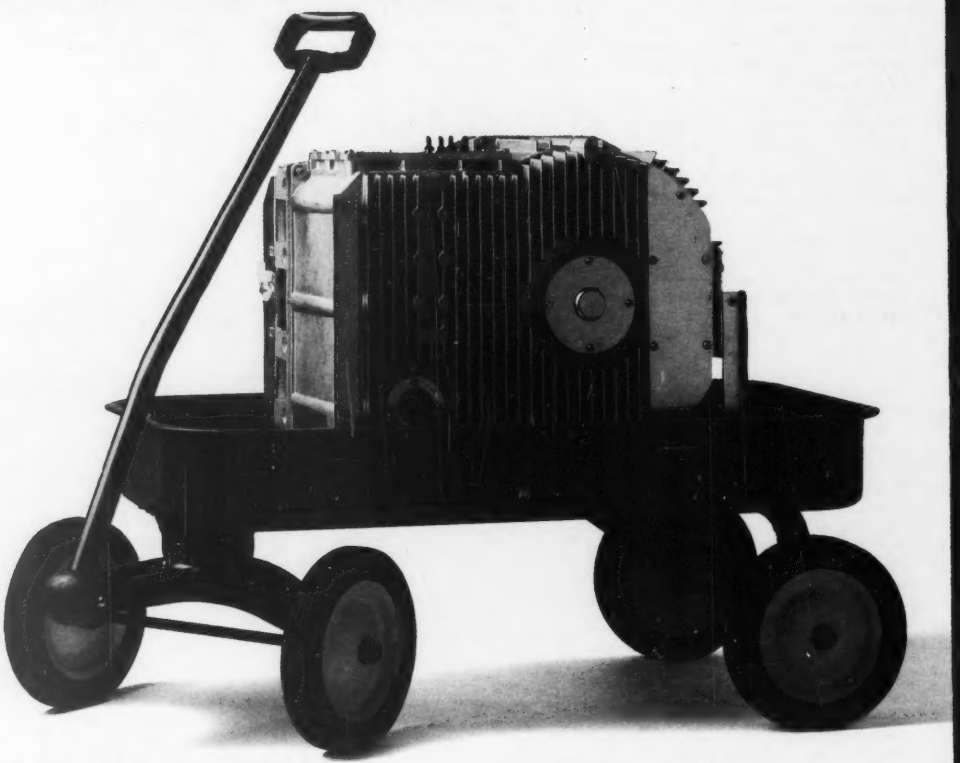

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Continued from page 53

macros based on Index Technology Corp.'s Excelerator computer-aided software engineering (CASE) development tool have been announced by **The Hobbs Group.**

BMSgen and **MFSgen** produce the source macros for IBM's IMS/DC and CICS screen languages from Excelerator CASE Design and Prototype Software interface files. Both allow Excelerator designers and analysts to prototype and design screens in Excelerator, generate the Excelerator screen interface file, run BMSgen or MFSgen to create the required source macros and transfer the designs to the mainframe computer.

Priced at $225 each, the utilities run on IBM Personal Computer XTs, PC ATs or compatibles.

The Hobbs Group, P.O. Box 02171, 7017 S.E. 35th Ave., Portland, Ore. 97202.

Component-level **troubleshooting software** designed for testing the IBM Personal Computer AT has been introduced by **Techpro Corp.**

The software runs on a Fluke 9010A Micro-System Troubleshooter and includes diagnostics and guided fault-isolation programs to troubleshoot the integrity of the AT I/O Channel Connectors, the data and address buses, critical control signals, I/O chips and system memory.

The package, including two minicassette tapes for the Fluke 9010A, costs $3,000.

Techpro, P.O. Box 5294, Springfield, Va., 22150.

Bridgeware, software said to create Prolog data bases that can be used as knowledge bases in expert and other intelligent systems, has been announced by **Microbase Software Systems, Inc.**

Bridgeware operates as a stand-alone application. It works with plain ASCII files and can access data from most packages and languages, including Ashton-Tate's Dbase, Lotus Development Corp.'s 1-2-3, Basic, Pascal, C and mainframe data bases. According to the vendor, it is capable of combining information from several applications into a single knowledge base.

Bridgeware runs on IBM Personal Computers and compatibles under Microsoft Corp. MS-DOS 2.0 or higher. It costs $69.96.

Microbase, Box 550, Medford Office Center, Medford, N.J. 08055.

Development tools

An enhanced version of **Baby/36** software, which emulates the operating system of the IBM System/36 on IBM Personal Computers and compatibles and local-area networks (LAN), has been announced by **California Software Products, Inc.**

Release 3.5 features revision of the data file-conversion utility to let it function as a systems-support program. Other features include a rewritten source-entry utility and an 8-million-record limit. It supports IBM Proprinters and has a keyboard profiler and a utility software package, including a set of diagnostics tests.

Upgrades to Baby/36 Release 3.5 cost $200. Baby/36 costs from $650 for execution-only versions to $3,500 for complete systems. LAN versions range from $1,500 to $4,500 plus $100 per linked device.

California Software, 525 N. Cabrillo Park Drive, Santa Ana, Calif. 92701. 714-973-0440.

A computer-aided software engineering (CASE) tool, called **TIP/PC**, has been announced by **Technology Information Products Corp.**

TIP/PC is a version of Index Technology Corp.'s Excelerator analysis and design workbench, customized to support the TIP's development, planning and analysis methodologies. It supports all five graphic types and 15 individual textual description components necessary for the development and analysis of the models used in TIP's proprietary methodology.

TIP/PC is priced at $9,200.

Technology Information, 12 New England Executive Park, Burlington, Mass. 01803.

A code-generating graphics editor called **Drawbridge** has been introduced by **Courseware Applications, Inc.**

According to the vendor, Drawbridge automatically generates the source code required to create graphics displays. It allows the user to view the image as it is created and to modify the display with various editing features.

Graphics objects available include arcs, boxes, circles, lines and polygons. They may be in color and can be either outlined or painted. A built-in text editor allows the addition of text to graphics displays.

Drawbridge runs on IBM Personal Computers and compatibles with 256K bytes of memory. It costs $129.

Courseware, 475 Devonshire, Champlain, Ill. 61820.

Data storage

A line of certified backup-tape media products featuring a lifetime replacement warranty has been announced by **Emerald Systems Corp.**

Designed for use with the company's tape backup subsystems, the **Lifetape** backup media includes certified 60M-byte cassettes and 60M- and 120M- byte ¼-in. cartridges. According to the vendor, all Lifetapes are tested for defects, dropouts and over or under runs, as well as for mechanical integrity of the outer shell and

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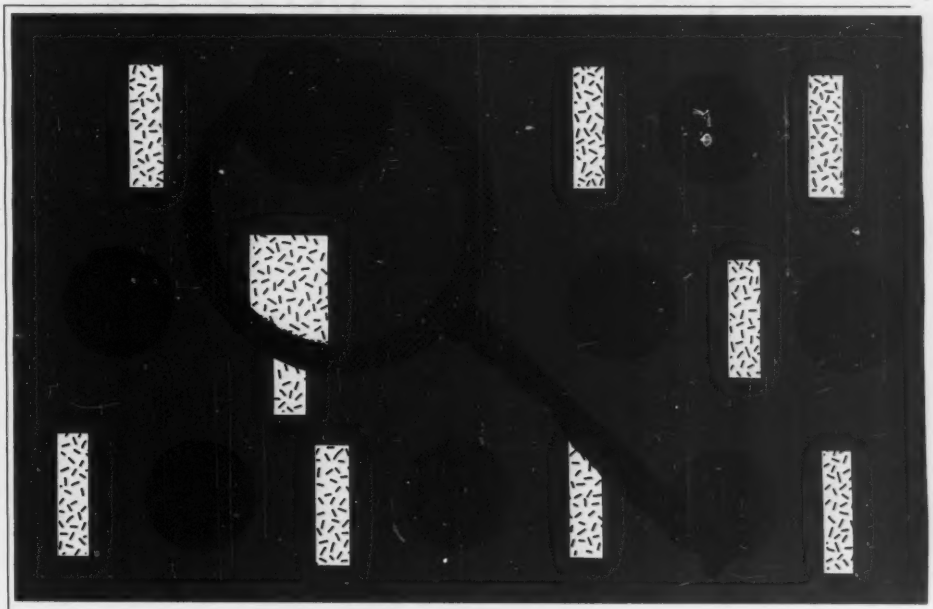

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Through an on-line menu display, you can see the exact differences VERIFY discovers during its interactive comparison. And respond immediately with two full menus of mismatch processing options.

In addition, VERIFY provides several levels of in-depth security for your data, with options like on-line "ownership" of test streams, dark field protection, and customized limitation of VERIFY usage. It's easy to install too, because VERIFY is distributed on a "link and go" tape.

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Continued from page 55

drive mechanisms. The warranty program allows any registered Lifetape media product to be replaced at no charge should failure occur.

The ½-in. nine-track tapes cost $39 each; a five-pack of cassette tapes costs $160; a five-pack of 60M-byte color-coded data cartridges costs $195; and a five-pack of 120M-byte color-coded data cartridges costs $250.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117.

Nth Group has announced its **small computer system interface** (SCSI) **tape backup systems** for the IBM Personal Computer and compatibles.

The 60M-byte SCSI tape-backup system is available in an internal and an external model. It comes with SCSI Host adapter and software. The software provides image and file-by-file operation along with tape director and erase utilities. The backup systems operate under IBM's PC-DOS and Microsoft Corp.'s MS-DOS.

The internal model is priced at $699. The external model costs $849.

Nth Group, P.O. Box 1287, West Hills, Calif. 91304.

Information Storage, Inc. has reduced the price of its write-once read-many (WORM) optical-storage drive subsystem products for IBM Personal Computers and compatibles.

The external subsystem, the **ISI 525 WC Optical Disk Subsystem**, featuring 230M bytes on double-sided media cartridges, drive, controller card, software and cable, now costs $2,795. The internal mount configuration costs $2,595.

The vendor also announced its **Gigabyte Optical Subsystem**, a 5¼-in. WORM drive offering more than 500M bytes of storage per side. It is priced at $4,495 and will be available in the fourth quarter.

Information Storage, 2768 Janitell Road, Colorado Springs, Colo. 80906.

A desktop, tape subsystem that allows IBM Personal Computers, PC XTs and ATs to read and write nine-track mainframe ½-in. tapes has been introduced by **M4 Data, Inc.**

The turnkey system includes M4 Data's desktop 9800 tape drive, a controller card that plugs into a PC expansion slot, software and interface cabling.

Features include self-loading and self-threading. Software utilities include allowing for reading a variety of file-structured tape data formats and providing ASCII/EBCDIC code conversion at the PC for reading mainframe- generated tapes and for creating tapes for mainframe use.

The tape subsystem is priced at $3,895.

M4 Data, Building 14, 3815 N. U.S. 1, Cocoa, Fla. 32926.

A series of internal hard disk drives for Apple Computer, Inc. Macintosh computers has been announced by the **Rodime, Inc.** Peripheral System Division.

The series includes the **Rodime 450 RX** 45M-byte drive, the **Rodime 1000 RX** 100M-byte drive and the **Rodime 1400 RX** 140M-byte drive.

The 450 RX was designed for both the Macintosh SE and the Macintosh II. It has an average seek time of 28 msec and employs an embedded small computer systems interface (SCSI) controller. Up to seven peripherals can be daisy-chained.

The Rodime 1000 RX and 1400 RX are 5¼-in. hard disk drives for the Macintosh II. Both offer average seek times of 28 msec, and both have embedded SCSI controllers.

Prices for the 450 RX, 1000 RX and 1400 RX are $1,595, $2,995 and $3,495, respectively.

Rodime, 29525 Suite 214, Chagrin Blvd., Pepper Pike, Ohio 44122.

Printers/Plotters/Peripherals

An integrated desktop publishing system made up of of a microcomputer, a laser printer and an image scanner has been unveiled by **Canon U.S.A., Inc.**

The system, called the **Canon Express Desktop Publisher** features software

Find Out What's Going On Between Apple And IBM.

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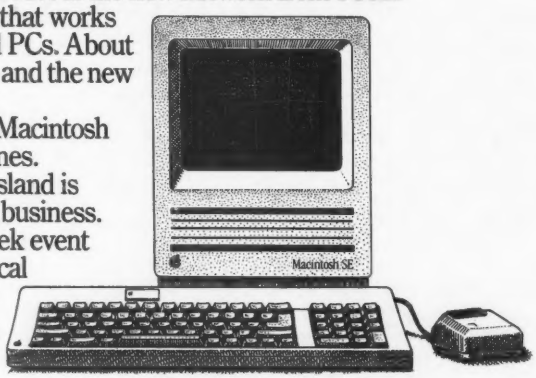
For our Macintosh Week event schedule, contact your local Businessland Center. To find the one nearest you, call (800) 323-1000.



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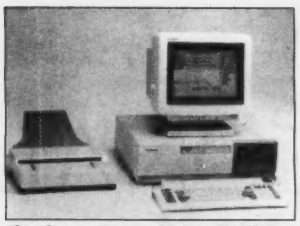


The *Canon Express Desktop Publisher*

capabilities that include integration of word processing with page composition and layout. Text editing is done on the composed page in a what-you-see-is-what-you-get format.

Hardware components include a Canon A-200EX microcomputer with a 20M-byte hard disk. The scanner has scanning densities of 300, 200, 150, or 75 dot/in. and can operate at a speed of 12 sec./page at 300 dot./in.

The Desktop Publisher, including Canon Expression Software, costs $9,950.

Canon U.S.A., Systems Division, One Canon Plaza, Lake Success, N.Y. 11042.

A 14-in. high-resolution color monitor, the **Model CM-1493**, has been introduced by **Tatung Co. of America, Inc.**

The monitor is said to be compatible with all models of the IBM Personal System/2 family and to accept analog output from the PS/2's built-in Video Graphics Array and Multiple Color Graphics Adapter.

The monitor has a 0.31mm dot pitch and provides resolutions of 720 by 400 pixels in text mode and 640 by 480 pixels in graphics mode. It offers 256 simultaneously displayable colors from a palette of 256,000.

The Model CM-1493 is priced at $689.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

A 300 dot/in. intelligent image and text scanner has been announced by **Microtek Labs, Inc.**

The **MS-300C** offers a choice of eight halftone screen patterns and 15 brightness and contrast settings. The device can scan both halftone photographs and line-art drawings in one pass. Windows can be drawn to specify the areas that include photographs or drawings.

Interfacing the Apple Computer, Inc. Macintosh is through a 57K-byte serial port or an optional small computer systems interface port. To interface to IBM Personal Computers, a parallel interface card is included.

The MS-300C costs $1,695.

Microtek Labs, 16901 S. Western Ave., Gardena, Calif. 90247.

A print server that allows up to eight users to simultaneously access up to four printing devices has been announced by **AST Research, Inc.**

The server, called **Premium Connection**, was designed for use with AST's Turbolaser printer but can work with any serial or parallel printer or plotter, the vendor said.

Three models are available. All feature two full-length, eight-bit IBM Personal Computer slots, two plug-in expansion adapters, 512K bytes of random-access memory, four asynchronous serial sharing ports, one serial printer port and one parallel pinter port. Model 1 loads software and fonts from a host computer. Model 2, with a 1.2M-byte floppy disk, and Model 3, with a 20M-byte hard disk, are self-contained.

Models 1, 2 and 3 cost $1,150, $1,495 and $1,995, respectively.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

An IBM-compatible full-page document reader with document formatting capabilities has been announced by **Saba Technologies, Inc.**

Page Reader supports the formats of such word processing programs as Micropro International Corp.'s Wordstar, Microsoft Corp.'s Word, Ashton-Tate's Multimate, Wordperfect Corp.'s Wordperfect and IBM's Displaywrite. Features include the ability to transfer columns of words and numbers into Lotus Development Corp.'s 1-2-3 and to capture such business graphics as charts and graphs.

Page Reader has a built-in sheet feeder that enables it to read stacks of up to five typewritten pages. While the scanner is operating, users can continue to use the personal computer for other tasks.

Page Reader costs $1,299.

Saba Technologies, 9300 S.W. Gemini Drive, Beaverton, Ore. 97005.

A 19-in. monochrome display featuring 1,600- by 1,200-pixel resolution and available for both IBM Personal Computers and compatibles and Apple Computer, Inc.'s Macintosh II has been introduced by **Cornerstone Technology.**

The **Vista 1600** noninterlaced display offers a 67Hz refresh rate and full-page viewing. The IBM-compatible product emulates the IBM Color Graphics Adpater standard and is compatible with environments such as Microsoft Corp.'s Windows and Digital Research, Inc.'s Graphics Environment Manager.

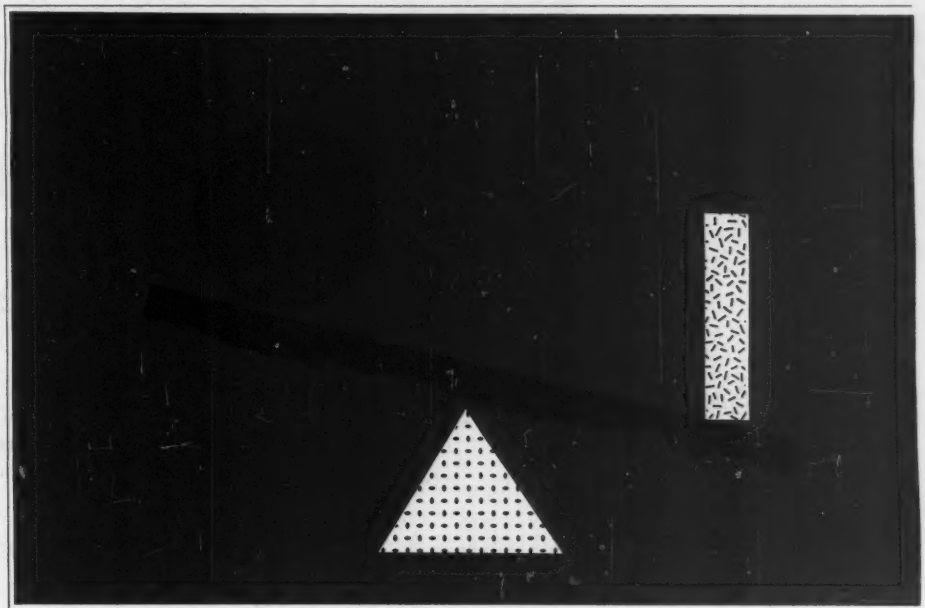
The Vista 1600 includes a display generator controller card that occupies a single expansion slot. Prices start at $2,195.

Cornerstone, 175A E. Tasman Drive, San Jose, Calif. 95134.

Board-level devices

General Computer Corp. has announced the **Hypercharger 020, Hy-**

Continued on page 59



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Continued from page 57

perdrive FX/40, Hypernet 2.0 and the **Hyperdrive FX/20** Apple II software conversion kit for the Apple Computer, Inc. Macintosh and Apple II personal computers.

Hypercharger 020 is an enhancement board for the Macintosh SE featuring a 16-MHz Motorola, Inc. 68020 microprocessor. It costs $1,499. The Hyperdrive FX/40 is an external 40M-byte small computer systems interface (SCSI) hard disk for the Macintosh. It costs $1,799.

Hypernet 2.0 is an upgraded version of the vendor's file-serving software. It costs $299. The Hyperdrive FX/20 Apple II conversion kit includes software that allows an external 20M-byte SCSI hard disk to work with the Apple II product family. It costs $29.99.

General Computer, 215 First St., Cambridge, Mass. 02142.

Conographic Corp. has announced the **Conodesk 6000** controller board, which it claimed is compatible with Adobe Systems, Inc.'s Postcript language.

The Conodesk 6000 offers 40 page/min. or better raster operations; selectable print resolutions of 300 by 300, 400 by 400 or 600 by 300 dot/in.; intelligent laser-print engine controller; page-description language interpreter; scanner interface; up to 2M bytes of extended memory specification random-access memory available to the host personal computer; Hewlett-Packard Co. Laserjet compatibility; and outline to bitmap rendering.

The vendor said the Conodesk 6000 will be available in September and is priced from $1,995.

Conographic, 17841 Fitch, Irvine, Calif. 92714.

Hewlett-Packard Co. has upgraded its **HP 9000 Series 300** DOS coprocessor to support 16 localized keyboards.

The Series 300 DOS coprocessor is a combined hardware and software product that allows Series 300 technical workstations to run IBM Personal Computer AT-compatible applications. The enhanced product also includes HP-UX mouse emulation of the Microsoft Corp. Mouse and improved system integration under HP Windows. Other features include the ability to temporarily freeze the DOS process.

Revision 1.1 of the HP 9000 Series 300 DOS coprocessor system is priced at $1,295.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

An extended enhanced graphics adapter (EGA) card that supports both a high resolution of 800 by 600 pixels and a mid-range resolution of 640 by 480 pixels has been announced by **NSI Logic, Inc.**

Called **Smart EGA Plus**, the half-size board uses multisynchronous monitors to run software written for IBM's Personal System/2 video graphics array standard. It is based on a proprietary very large-scale integration graphics chip, which employs gate array technology.

Smart EGA Plus is priced at $499.

NSI Logic, Cedar Hill Business Park, 257-B Cedar Hill Road, Marlboro, Mass. 01752.

The 16- to 20-MHz zero-wait state **386 Performer** motherboard has been announced by **CSS Laboratories, Inc.**

The 386 Performer is an IBM Personal Computer AT-size version of the Intel Corp. 80386. It is keyboard-selectible for 8M or 16MHz and features one 32-bit memory slot and five 16-bit and two 8-bit expansion slots. On-board memory is 1M-byte static-column random-access memory (RAM), upgradable to 2M bytes.

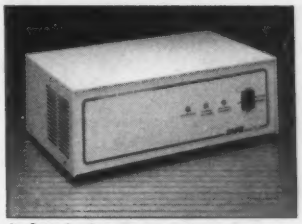
The 386 Performer costs $1,980 with 1M byte of 100-nsec static-column RAM.

CSS Laboratories, 2134 S. Ritchey St., Santa Ana, Calif. 92705.

Auxiliary equipment

A 500W backup power unit designed to protect microcomputers from loss of data or damage caused by short circuits, power fluctuations or outages has been introduced by **Safe Power Systems, Inc.**

The Safe 500 Watt backup power system provides filtered AC current and up to 20 minutes of runtime for fully loaded hard-drive personal computers during electrical blackouts. Features include alarms and lamps that automatically indicate power loss, overloads and low battery status as well as automatic synchronized transfer time of less than two msec.



Safe's *backup power system*

The Safe 500 Watt costs $795.

Safe Power Systems, 528 W. 21st St., Tempe, Ariz. 85282.

An uninterruptible power supply that provides five minutes of on-line power backup for personal computers in sets of two each has been introduced by **Clary Corp.**

According to the vendor, the **Model PC-1125** provides 765W of peak repetitive power for dual primary loads and 360VA of isolated, conditioned power for dual secondary loads such as printers, modems and remote screens.

The Model PC-1125 costs $890.

Clary, 320 W. Clary Ave., San Gabriel Calif., 91776.

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With the WY-85 at left, Wyse authored the best selling alternative to DEC's VT-220. It's fully compatible with the VT-220, but loaded with features that make it even more compatible with the people who use it.

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Our new WY-99GT at right further illustrates Wyse's continuing drive to improve on a standard. It features the same advantages as the WY-85. Plus graphics, with full Tektronix 4010/4014 compatibility, and high resolution characters.

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70. Petro Chem, Mining, Construction, Agriculture
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DATA STREAM

Merv Adrian

Gateway tips to consider

While local-area network (LAN) gateways have been around for quite a while, their sales curve began increasing steeply in the last year or so as mainframe-based shops began installing LANs in large numbers.

Like any new technology, LAN gateways impose several tasks on the information systems professional, such as a new set of technical concepts to master, specifications to understand and products to compare. In the case of gateways, there are a number of issues one should address to make an accurate decision.

• **Number of users to be supported.** Don't skimp on this; it's a lot harder to add capacity later on to a LAN because there are fixed sizes associated with the products you buy. Although only one connection might be needed to add sessions, that connection might be a direct line to your front-end processor, and it might be in short supply. Connections to cluster controllers may be easier, assuming there are ports there. Include in your capacity planning any printer sessions you

Continued on page 67

Bridge offers encryption tools

Family of TCP/IP-based LAN products paves safe path to net devices

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — The Government Products Division of Bridge Communications, Inc. is slated to announce today the Bridge Secure Network System (BSNS), a family of encrypted LAN products based on Transmission Control Protocol/Internet Protocol (TCP/IP), the industry standard.

"The use of TCP/IP allows us to offer a secure communications path to devices on the BSNS and to be fully interoperable among multivendor systems in a nonsecure mode on any TCP/IP LAN — Bridge or non-Bridge," said Tom Russell, Government Products Division manager.

Concern about losses resulting from security breaches has mounted with the proliferation of effective network analysis tools that let outsiders tap in and monitor data on the network, Russell said. BSNS products use multiple encryption schemes to minimize the possibility of data compromise in these environments, he added.

Starting a family

The Secure Communications Server/50 (CS/50) and Secure Network Control Station/AT (NCS/AT) are the first two members of the BSNS family of local-area network (LAN) products, which was designed to provide data security and access control for network users and resources.

Secure CS/50 is a compact server said to support two asynchronous terminals, printers, host ports or personal computers. Secure NCS/AT is an IBM Personal Computer AT Xenix-based network management station that reportedly allows centralized control and monitoring of LAN-attached computer resources.

Based on the TCP/IP set, both products come with three different interfaces: standard Ethernet, IEEE 802.3; Bridge's 5M bit/sec. carrier-sense multiple access/collision detection broadband network interface; or a thin Ethernet, IEEE 802.3 10 Base 2. On the Secure CS/50, thin Ethernet is embedded, eliminating the need for an external transceiver and cable.

Both products reportedly provide user authentication, se-

Continued on page 65

Data View

Network cable
Who decides on purchasing

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Datapoint connects to SNA, OSI standards

BY PATRICIA KEEFE
CW STAFF

SAN ANTONIO, Texas — Datapoint Corp. recently announced the Vista-Gate Network Communications Server, which is said to provide compatibility with IBM's Systems Network Architecture (SNA) and the ISO's Open Systems Interconnect environments.

The product also reportedly serves as a platform for future advanced protocol support, such as for IBM's Professional Office System (Profs).

Vista-Gate was co-developed with Communications Solutions, Inc. in San Jose, Calif., and TITN, Inc. in Hayward, Calif.

Direct access to Profs will be announced within the next six months, according to a Datapoint spokesman. Datapoint At-

Continued on page 65

DEC drafts three-year strategy

With Decworld '87 as the backdrop, Digital Equipment Corp. last week unveiled the following rough sketch of its strategy for enhancing its Decnet architecture during the next three years:

• Provide greater flexibility in linking computers and desktop devices together by expanding the choice of communications media available to the user.

• Enable users to connect both DEC and non-DEC systems into enterprisewide networks as easily as plugging in a telephone.

• Ensure interoperability of non-DEC systems in Decnets.

• Allow for management of enterprise networks, including voice and data, in both local- and wide-area environments.

• Enable users to build and manage very large, geographically dispersed computer networks and let inherent flexibility accommodate changes in technology or in a firm's organization.

• Allow users to share information on systems worldwide.

Inside

• The Wollongong Group to strut TCP/IP support at FCC conference. Page 63.
• IBM investigates intelligent networking with Sweden's Ericsson. Page 63.
• C&C/Comendec package links VAXs to Arcnet. Page 71.

printf("Hello, MAINFRAME world\n");

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The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C.

And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs.

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TCP/IP supports Streams, OSI

BY PATRICIA KEEFE
CW STAFF

PALO ALTO, Calif. — The Wollongong Group, Inc. said it will demonstrate Transmission Control Protocol/Internet Protocol (TCP/IP) support for both AT&T's Streams and the ISO's Open Systems Interconnect (OSI) model next week at the Federal Computer Conference in Washington, D.C.

Wollongong is slated to introduce Streams-based TCP/IP communications software for systems running AT&T's Unix System V, Release 3.1, as well as demonstrate an OSI-to-TCP/IP gateway, designed to permit a smooth migration to ISO-based environments in the future.

Wollongong Integrated Networking Solutions (WINS)/Streams, the new software, combines TCP/IP support for standard user protocols with Streams, the framework for implementing network protocols developed by AT&T as part of Unix System V, Release 3.

Central to WINS/Streams' flexibility are portions that are implemented as independent multiplexed Streams drivers, which Wollongong claimed are unavailable in this manner from any other supplier.

Opens RFS gate

This independence enables concurrent use of AT&T's Remote File Sharing (RFS), which allows transparent resource and file sharing among heterogeneous Unix machines and other TCP/IP user-level services. As an additional option to TCP/IP, Wollongong has implemented the OSI layers.

WINS/Streams also provides programming libraries for the AT&T standard Transport Level Interface and the University of California at Berkeley's Socket Library.

Pricing for WINS/Streams is not yet available.

Software support

To assure that network managers will be able to migrate existing TCP/IP systems to future OSI protocols, Wollongong said it will display an enhanced version of its WINS/TCP software running TCP/IP and OSI concurrently under Unix System V, Release 3.1, which supports both RFS and Streams.

In this enhanced version, Wollongong said it will augment TCP/IP protocols at layers one through four on WINS with equivalent OSI layers to create software that contains both protocol sets.

Also demonstrated will be OSI layers five through seven in the form of FTAM over TCP/IP, the vendor claimed.

The WINS family supports AT&T's 3B computers, National Seminconductor Corp.'s Series 32000 computers, IBM Personal Computers running Microsoft Corp.'s MS-DOS, Digital Equipment Corp. VAXs and Microvaxes running VMS or Unix System V, Hewlett-Packard Co.'s HP 9000 Series 500 computers running HP-UX and Cray Research, Inc. supercomputers.

IBM, Ericsson explore joint networking deal

BY AMIEL KORNEL
IDG NEWS SERVICE

PARIS — IBM tightened its web over the European telecommunications equipment market with the recent announcement, made here, that it has launched a joint study with Sweden's L. M. Ericsson in the area of intelligent networking.

In a prepared statement, IBM Europe said the two companies will seek ways of combining IBM's expertise in data base and data network management technology with Ericsson's Axe switching technology.

The object of the study is to develop technical solutions based both on standard IBM and Ericsson systems and specialized software for the intelligent network concept.

The nonexclusive agreement provides for architecture definition activities between IBM systems and Ericsson switches, connectivity tests between IBM equipment and the Axe switch using standard interfaces and product opportunity evaluation.

IBM has signaled its intention of becoming a major player in European telecommunications for some time, lending its support to moves toward deregulation and reorganizing business units to meet the challenge.

"They have to find some way for increasing revenue," commented Martin Hingley, senior consultant at London-based market research firm International Data Corp. Europa, "and one of the obvious ways is in telecommunications."

In June, IBM announced the formation of a new organization — Integrated Services Switching Systems — for developing and manufacturing voice- and data-switching systems in Europe. One of the new unit's main tasks will be to adapt IBM's Rolm Corp. switching equipment to meet the standard requirements of Europe's powerful telecommunications authorities, the PTTs.

Ericsson recently improved its position in the French telecommunications market when a consortium it is leading won a bid for the Compagnie General des Constructions Telephoniques, one of France's two major switch suppliers.

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Bridge

CONTINUED FROM PAGE 61

curity profiles, access controls, data encryption and audit-trail information for controlling and monitoring — in addition to analyzing — sensitive and proprietary data.

DES standard used

All TCP/IP sessions are encrypted using the Data Encryption Standard (DES), an encryption algorithm certified by the National Bureau of Standards.

In addition, administrative and audit trail information transferred to and from the Secure NCS/AT is encrypted under a public key-encryption system.

Combining public keys and DES ensures data security without the vulnerability of a single read-only memory-based networkwide key, Russell claimed.

Access control levels

BSNS products can operate in both secure and open modes under the control of the network manager. There are three levels of access control: network access — when and via which ports a user can access the network; security access — individual access level and user-group partitions; and resource acccess — access to a given resource.

The Secure NCS/AT security audit trail records log-in, access-control violations and key-management activity, Bridge said.

Fully compatible with Bridge's TCP/IP and PC network products, the Secure CS/50 and NCS/AT offer a range of services, including logical names, named command sequences for macros, speed- and flow-control matching and a context-sensitive Help facility.

Motorola-based

BSNS products use a multiple Motorola, Inc. 68000 architecture, an Intel Corp. 82596 LAN coprocessor and 512K bytes of dynamic random-access memory per CPU. The Secure CS/50 offers up to 16 simultaneous open sessions per server and eight per physical port, as well as data rates of up to 19.2K bit/sec. It costs $2,195.

The Secure NCS/AT is based on PC AT-compatible hardware, stores up to 2,048 logical names and configuration information to the port level for each attached server.

It costs $17,900.

An NCS/AT upgrade kit is available for $6,250.

Datapoint

CONTINUED FROM PAGE 61

tached Resource Computer (ARC) local-area network (LAN) users today must go through IBM 3270 emulation into Vista-Gate onto a host running Profs, he added.

Vista-Gate enhances Datapoint's connectivity capabilities to provide concurrent support of any combination of a number of IBM services over the IBM Synchronous Data Link Control (SDLC) or CCITT X.25 data link, Datapoint said.

Those services include IBM 3278 display station emulation, 3287 printer emulation, 3777 Remote Job Entry, Document Interchange Architecture and LU6.2.

These connectivity capabilities are available as network resources on the ARC LAN. Vista-Gate provides the user with fully functional access from either a Datapoint multifunction workstation or an industry-standard personal computer supported by Datapoint's Starbuilder PC integration system.

ARC users will be able to continue using existing mainframe-oriented applications and information access while simultaneously evolving toward fully distributed, advanced, peer-to-peer architectures, Datapoint claimed.

Using Vista-Gate, the vendor said, customers will have access to the following features:

- Sharing communications hardware and software over the network.
- Connectivity flexibility through support of switched and leased SDLC lines and X.25 packet-switched data networks for more communications options and potential savings.
- A function-independent, standard user interface said to make access to the new communications capabilities transparent to the user and available at a single keystroke.

Access to multiple sessions

By utilizing Vista-View, Datapoint's multitasking, multiwindowing interface, several users may each run up to eight sessions from a single workstation. Each user will have simultaneous access to multiple 3270, 3770 and IBM host Distributed Office Support System/370 sessions, Datapoint claimed.

In its initial release, Vista-Gate will support both SDLC (leased-line, manual-dial, switched, CCITT V.25 bis automatic dial) and X.25 public and private packet-switched networks.

Typical configurations and pricing, including hardware and software, are as follows: $5,495 for a 16-user SNA/SDLC 3270 and 3770 system; $6,245 for a 16-user SNA/X.25 3270 system; and $3,245 for an eight-user X.25 system.

These prices include an intelligent communications adapter, a high-speed Datapoint Resource Interface Module, a Vista-Gate-to-modem cable and the basic server software.

The communications server upgrade kit does not include the required 640K-byte personal computer with 1.2M-byte diskette drive or the workstation.

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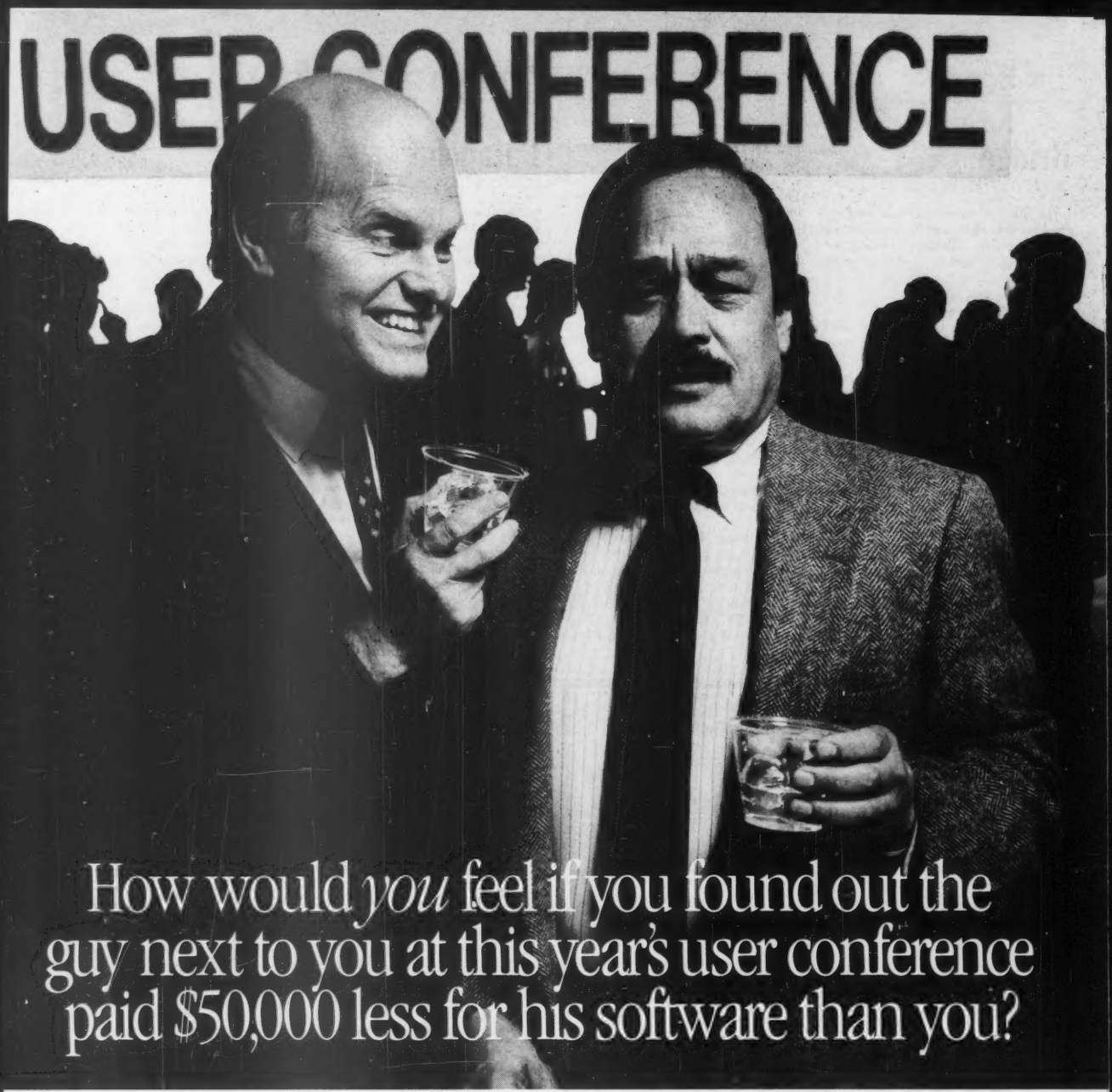

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Gateway tips

CONTINUED FROM PAGE 61

might need, because they are also logical units and will be counted just as are terminal sessions..

• **Number of sessions assigned to users.** There are two basic approaches to this: contention and assignment. In a contention-based system, there is a pool of sessions available on a first come, first served basis. In an assignment system, sessions are dedicated to specific users. The latter is important for printers and terminals that will run production jobs. Some products support both approaches.

• **Predicted growth and use rate of the mainframe network.** Many personal computer-based shops, even those that perform a large amount of mainframe work via terminal emulation, typically call someone and ask, "Can you run a line to this desk for us to hook up?" You must be better informed than that. You need to decide how flexible your environment is going to be and what your margin of error is.

MANY PERSONAL COMPUTER-based shops, even those that perform a large amount of mainframe work via terminal emulation, typically call someone and ask, "Can you run a line to this desk for us to hook up?" You must be better informed than that.

• **Estimated cost of additional users.** Say you are attaching the network to a cluster controller that is approaching maximum capacity. How easy will it be to add another controller? Are there lines to run back to the host? Will there be ports available when you get there? These are questions you should ask.

• **User expertise vs. the level of local support.** A related issue is how much user support the gateway provides. Even in the case of gateways that provide good information at the workstation, users need to be educated to interpret screen messages and also need a knowledgeable lead operator on call for specific questions.

• **Administration utilities.** How much does the system tell you about what is going on? Can you see exactly which logical units are in use? Can you see the quality of the lines and the location of active sessions? The absence of this kind of data, which is essential for diagnostics and monitoring, can be good reason to avoid an otherwise excellent product.

• **Using a dedicated machine as a communications server.** Some gateways require the use of a dedicated machine, which avoids potential bottleneck problems (especially if that machine is a garden-variety PC). But be careful. Broadcasts that lock up workstations can do the same to a communications server, unless the machine is set to reject such broadcasts.

• **Gateway support for multiple bridged networks.** You should ensure that users on one network can establish sessions on a host connected to a gateway on another network. Otherwise you will have to put a gateway in every LAN.

• **Cost considerations of providing backup hardware and lines.** If you're using an IBM Synchronous Data Link Control-based gateway, you have a single point of very high vulnerability. It is critical to know how good the vendor's support will be. Alternate strategies include using a redundant piece of hardware for backup, a second line or a standby dial-up connection. One or more of these is a good investment.

• **Test and test and then test again.** Different factors come into play with each application. Consider the combination of products and combination of keystrokes that will be involved. It can be fatal if applications want the same keystroke the gateway needs for some control function and you can't remap.

Adrian is manager of end-user computing at Shearson Lehman Brothers, Inc. and chairman of the NYPC Micro to Mainframe Special Interest Group.

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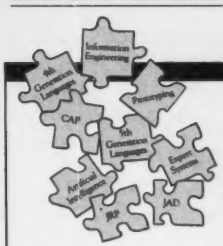

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T-3 Managing Mixed Vendor and Local Networks
Leader: Dr. Kenneth Thurber, president, Architecture Technology Corp.

This session will provide a thorough study of the issues involved in managing mixed vendor and local networks, stressing the function characteristics and capabilities of various designs and gateway technologies. Discussion includes LAN-based systems, Ethernet and token-ring gateways and LAN-to-LAN gateways. You'll learn how to evaluate and implement various technologies and products including those expected in the future. **Who should attend:** Especially useful for DP managers systems analysts, marketing managers and others who need to know how to manage mixed vendor local networks.

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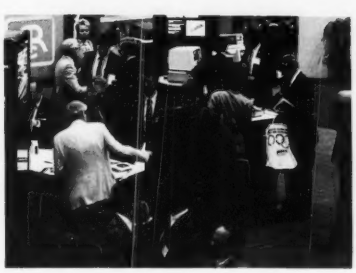

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BIT BLAST

Televideo, Micom strike controller OEM deal

Micom Systems, Inc. in Boxboro, Mass., has announced a multiyear OEM agreement with **Televideo Systems, Inc.** in Sunnyvale, Calif., for the purchase of Micom's NP600 Ethernet Controller, which also supports Transmission Control Protocol/Internet Protocol (TCP/IP).

The agreement is valued at approximately $5 million. Installed in Televideo's Telestar/386 workstations, the controller board will have a driver that communicates directly with the AT&T Unix System V, Release 3 operating system resident in Telestar.

Apollo Computer, Inc. in Chelmsford, Mass., and **Ridge Computers** in Santa Clara, Calif., have entered into a joint marketing agreement designed to offer Apollo workstations and Ridge reduced instruction set computing (RISC)-based superminicomputers as an integrated networking computing environment for technical professionals.

The companies' agreement includes cooperative advertising, corporate technical support and trade show participation as well as other marketing and promotional activities.

Apollo and Ridge will target companies requiring high-performance graphics, networking and computational capabilities in fields such as electronic design automation, mechanical computer-aided design and other engineering and scientific markets.

Utilizing Apollo's Network Computing System, a set of networking products for distributed computing, the firms will also work with third-party software vendors to tailor their applications to utilize Ridge superminis in a networked environment.

Network Research Corp. in Oxnard, Calif., has added support for **Sun Microsystems, Inc.'s** Network File Server (NFS) protocols to its Fusion Network Software on Digital Equipment Corp. VAX/VMS systems. This will reportedly enable VAXs to act as transparent servers for other NFS-supported systems. Users of these systems will be able to access and manipulate files stored on VAX/VMS computers with the Fusion NFS-based server while working on their own systems.

Network Research's NFS specification is based on Sun's Remote Procedure Call Source code. The Fusion NFS option was implemented using Network Research's Program Development System libraries on VMS, said to enable users to develop their own networking applications.

The underlying transport mechanism is Network Research's Fusion TCP/IP protocol package for VMS.

The Fusion NFS option will be available early in the fourth quarter for the VAX 11/700 and VAX 8000 families, Microvax II and 2000 and Vaxstation 2000 systems running the VMS 4 series operating system.

Pricing starts at $1,800.

Quadram Corp. has signed a licensing agreement with **Adobe Systems, Inc.** in Mountain View, Calif., that allows the Norcross, Ga.-based vendor to use Adobe's Postscript Interpreter with its Quadlaser printer. Adobe will provide Quadram with its Postscript controller board techology; Quadram will build the boards. The Quadlaser Postscript printer will cost $3,995. Current users can upgrade for $1,895.

The Quadlaser I has been reduced in price by $300. Both the new printer and the upgrade board are scheduled to ship in November.

Quadram also said it plans to pursue development of a Postscript controller that will include all printer emulation modes currently available with the Quadlaser I.

Excelan, Inc. in San Jose, Calif., and **Kinetics, Inc.** in Walnut Creek, Calif., announced the closing of their merger. Kinetics is now a wholly owned subsidiary of Excelan.

In accordance with the merger agreement, Excelan has issued 234,000 shares of common stock in exchange for all Kinetics shares outstanding. This brings Excelan's total outstanding shares to 8,350,632.

In addition, Excelan has granted options to purchase an aggregate of 140,963 shares of Excelan stock in lieu of outstanding Kinetics options to purchase 47,602 shares of Kinetics stock.

Access Data Products, Inc., a systems integrator based in Mount Vernon, N.Y., has announced an electronic bulletin board service dedicated to connectivity and networking issues.

Targeting MIS professionals, the bulletin board will be active 24 hours a day and will initially have two dedicated phone lines.

A third line will be installed before the end of the month, Access Data said.

There is no charge for using the board, which users will find to be organized by conferences when they log on.

A menu of conference choices will include Editorial (password-protected), Novell, Banyan, Other LAN Operating System, Arcnet, Pronet, Other LAN hardware and X.25.

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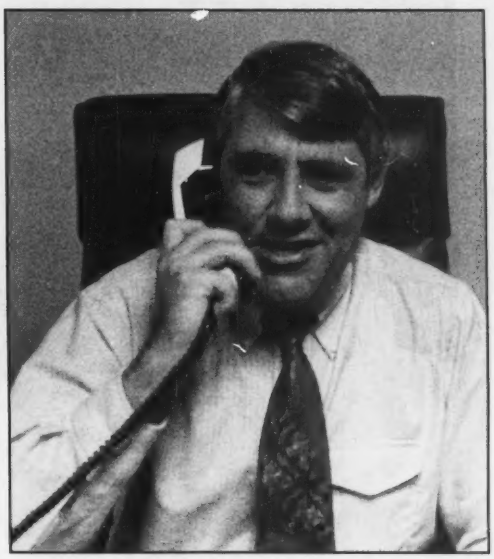
Thomas Business Systems



Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

In that time, Phil has used many methods of getting his message across to buyers and sellers. He's advertised in several publications off and on. But for 10 years, he has advertised regularly (an average of once every two weeks) in *Computerworld's BUY-SELL-SWAP* section.

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NEW PRODUCTS

Local-area network hardware

A series of disk subsystems designed for use with Novell, Inc. networks has been announced by **Advanced Digital Information Corp.**

The **Series 700** subsystems are small computer systems interface-based, allowing daisy-chaining of multiple units. They also utilize the run-length-limited encoding method. Average access time is said to be 28 msec.

Models are available in disk storage capacities ranging from 109M to 488M bytes. Prices range from $4,000 to $12,000.

Advanced Digital, P.O. Box 2996, 14737 N.E. 87th St., Redmond, Wash. 98073.

Local-area network software

Two menu- and window-driven communications programs for IBM Personal Computers and compatibles have been announced by **Kortek, Inc.**

Freeway provides control of more than 34 communications settings. Terminal emulations available include teletype and Digital Equipment Corp. VT100 and VT52. ASCII Kermit, Freeway and Freeway Server protocols are also supported. Data transfer rates range from 75K to 115.2K bit/sec. Features include pop-up command menus, phone books, on-line Help and a page editor.

Freeway Advanced adds a script facility, automatic answer, uploading and downloading of files and additional command parameters to the basic Freeway features.

Freeway costs $24.95. Freeway Advanced costs $89.95.

Kortek, 505 Hamilton Ave., Palo Alto, Calif. 94301.

Network management

A network management system, said to establish and maintain multiple sessions across mainframes, minicomputers and microcomputers running various jobs using terminal protocols, has been announced by **Century Analysis, Inc.**

M-Link enables multiple terminal sessions to be active simultaneously. It supports application nodes such as NCR Corp. 8000 VRX, NCR 9800 VRX/E, NCR Tower Unix, and Digital Equipment Corp. VAX and University of California at Berkeley Unix 4.2, application end-points such as IBM Systems Network Architecture, CCITT X.25 and Transmission Control Protocol/Internet Protocol hosts and intelligent workstations.

M-Link is priced between $5,000 and $10,000 per application node.

Century Analysis, 114 Center Ave., Pacheco, Calif. 94553.

Able Computer has added the **Resource Manager** centralized network management system to its Attach networking systems.

With the Resource Manager, Attach is said to provide port contention, dynamic load balancing and multisessions as well as a queueing function that allows users to wait for a resource.

Other functions include security, the ability to define Attach network parameters and provision of a network audit trail.

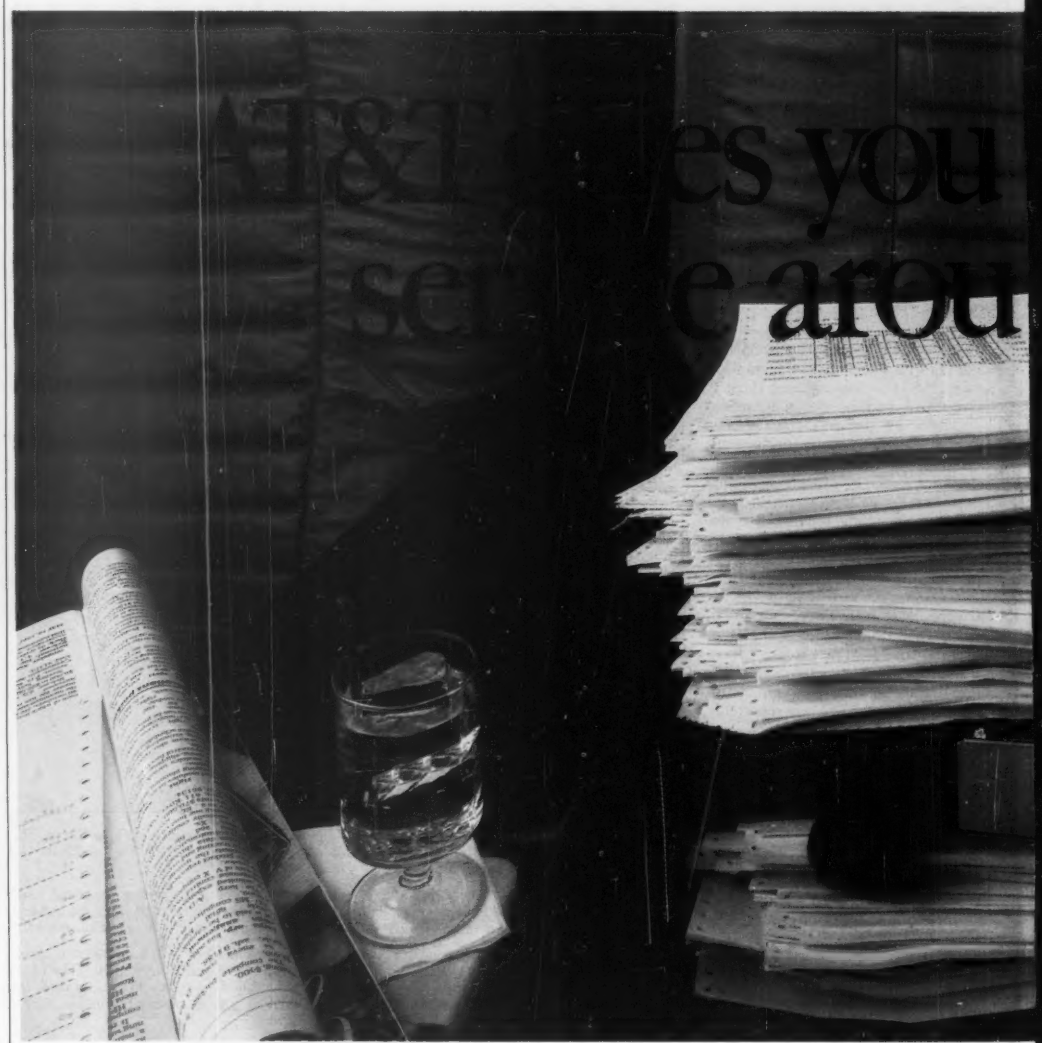
A baseline Attach system with the Resource Manager, 64 server ports and two 128-port front-end processors costs $18,000. Current Attach users can obtain the Resource Manager for $1,500.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

Customer-premise equipment

A card that interfaces and multiplexes data from an IBM 3174 or 3274 controller to a maximum of 16 IBM 3270 Category A peripherals has been released by **Fibronics International, Inc.** for use in its Unimux 832 chassis.

The **CC83242 IBM Channel Card** has a 50-pin RJ-21 receptacle to connect to an expander panel or telephone cables. The expander panel provides 16



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dual-purpose or RJ-11 connectors that can connect to a controller or peripherals.

Two Unimux 832 chassis fully configured with CC83242 cards can interface, multiplex and remote 128 IBM peripherals from four independent controllers up to 2.1 km. Diagnostic features monitor data on all 128 ports. Built-in baluns provide electrical port isolation.

The card costs $725.

Fibronics, Communications Way, Independence Park, Hyannis, Mass. 02601.

Lee Data Corp. has announced a **Smart Controller Option** for its Series 300 and 400 controller lines. It is said to allow IBM 3270 terminal users to run various office automation tasks at the controller level, off-line from the host processor.

The Unix-based multiuser system allows six to 12 Lee Data terminal users to share applications concurrently, exchange electronic messages and access peripherals. Standard features include an Intel Corp. 80286-based processor, a 1.2M-byte floppy disk drive, four expansion slots for additional memory and serial I/O board and AT&T Unix System V.2 Unix software.

The Smart Controller Option is priced at $10,995.

Lee Data, 7075 Flying Cloud Drive, Minneapolis, Minn. 55344.

Links

A software package for linking Digital Equipment Corp. VAX computers with VMS operating systems to Arcnet local-area networks has been introduced by **C&C/Comendec Ltd.**

The **Q-ARC-CX** software is offered at two levels. The basic CX device driver package is concerned with low-level control of the Q-ARC-01 hardware. The Q-ARC-CX/ACP contains the CX driver.

Single copies of the Q-ARC-CX device driver start at $750 for the DEC Microvax II version. A copy of Q-ARC-CX/ACP software starts at $1,100 for the Microvax II.

C&C/Comendec, P.O. Box 280, 708 Mandrake Drive, Batavia, Ill. 60510.

Cambridge Computer Corp. has announced versions of its micro-to-Honeywell, Inc. mainframe software products for the IBM Personal System/2 Models 50, 60 and 80.

PC77/78, which emulates the Honeywell VIP7700, VIP7800 and HDS series of synchronous terminals and provides for file-transfer capabilities, uses the PS/2 Multiprotocol Adapter for synchronous communications to the host. The file transfer software has been enhanced to support all host file formats.

PC73/78, which emulates the Honeywell VIP7200, VIP7300 and VIP7800 series of asynchronous terminals, has been enhanced to utilize any of the eight communication ports available for the PS/2. Features include Kermit and Xmodem file transfer capabilities, script processing, print reduction and color-attribute mapping.

PC77/78 costs $350. PC73/78 costs $295.

Cambridge Computer, 80 Mount Sanford Road, Mount Carmel, Conn. 06518.

Pacer Software, Inc. has announced that its **PClink** software package now provides Apple Computer, Inc. Macintosh- and IBM Personal Computer-to-Digital Equipment Corp. VAX integration over Ethernet.

PClink includes features for moving data between the DOS and Macintosh environments. It provides terminal emulation of DEC's VT100, VT200 and VT241; virtual disks; bidirectional file transfer of ASCII, binary and Macbinary files at rates up to and above 800K bit/sec.; remote printer access; and a command-file feature that allows users to construct customized communication applications.

PClink pricing is server-based. It starts at $2,000 per VAX.

Pacer, Suite 40279, 11 Herschel Ave., La Jolla, Calif. 92037.

A direct channel-attach unit linking Tandem and IBM systems has been announced by **Tandem Computers, Inc.**

The subsystem, called **Snax**

Continued on page 74

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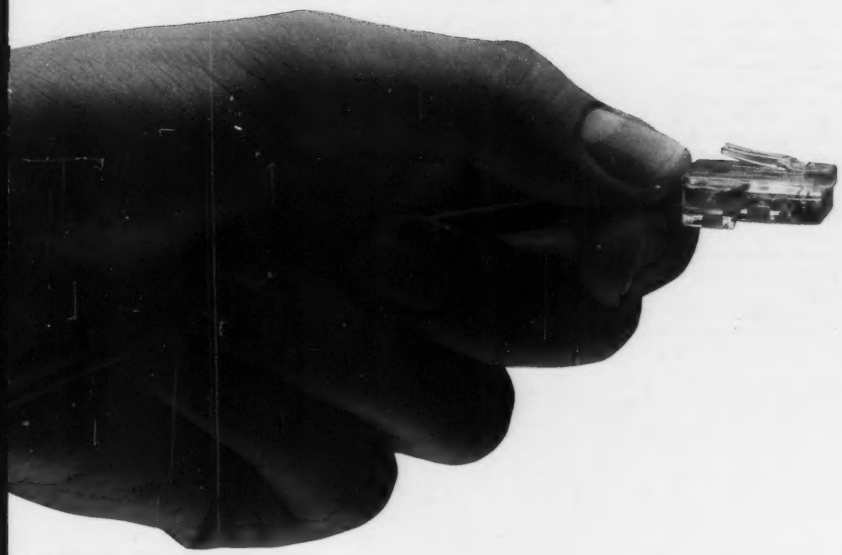
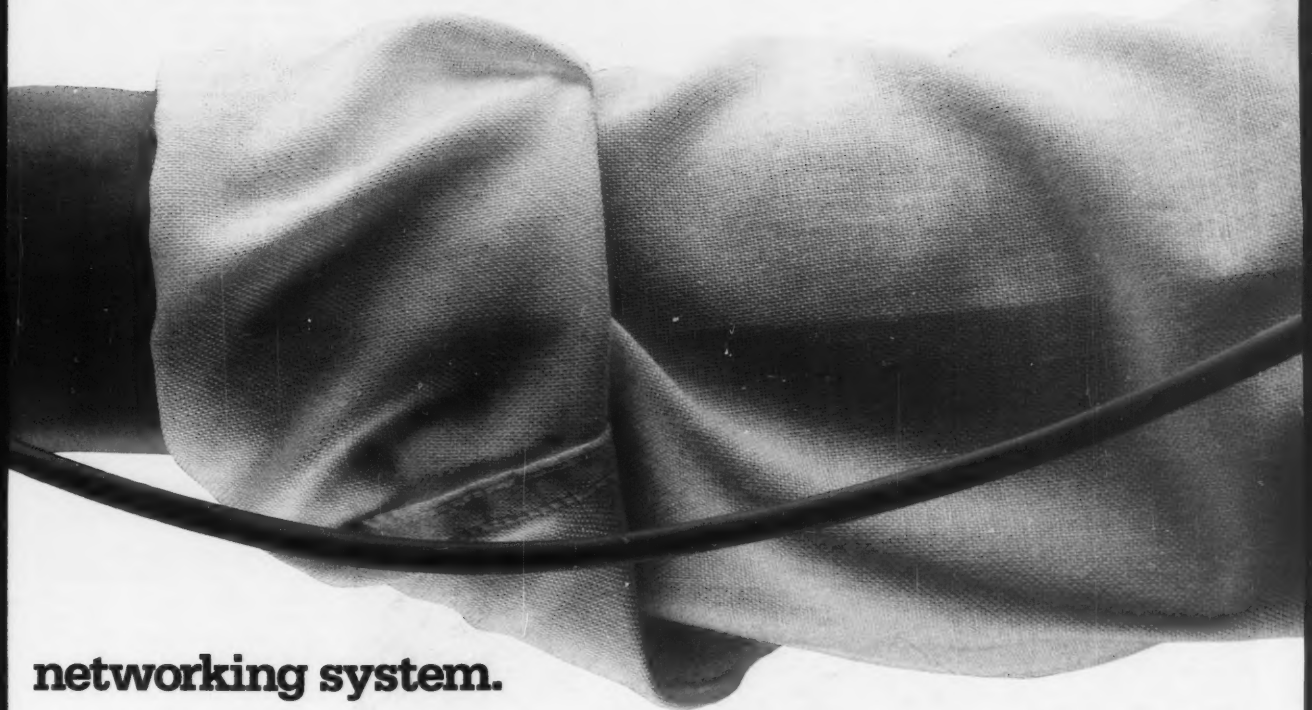


we never stop asking "What if..."

networking system.



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HEWLETT PACKARD

Continued from page 71

link, was designed for use in the IBM Systems Network Architecture environment. It serves as a communication path between Snax, Tandem's SNA access software and IBM's VTAM.

Snaxlink replaces multiple communications lines with a high-speed fiber-optic link attached to the I/O channel of an IBM or compatible system. Channel attachment allows full-duplex data transfer up to 1M bit/sec.

Snaxlink costs $49,550 for one unit and $79,676 for two. The basic monthly maintenance charge is $88 for one unit and $176 for two. The monthly software license fee is $125 per unit.

Tandem, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

An add-on program for Lotus Development Corp.'s 1-2-3 and Symphony said to link IBM Personal Computers to mainframe computers has been announced by **Intex Solutions, Inc.**

The memory-resident program, called **4-5-6 Link**, captures mainframe data into a Lotus spreadsheet. When 4-5-6 Link communicates with the mainframe, the personal computer emulates an IBM 3278 terminal.

Users can control the way the data is broken up and formatted into 1-2-3, and Link can format numbers as numerics and text as labels during transfer so data does not need to be parsed.

4-5-6 Link requires a physical connection to an IBM mainframe and a Digital Communications Associates, Inc. Irma board or compatible. It costs $199.

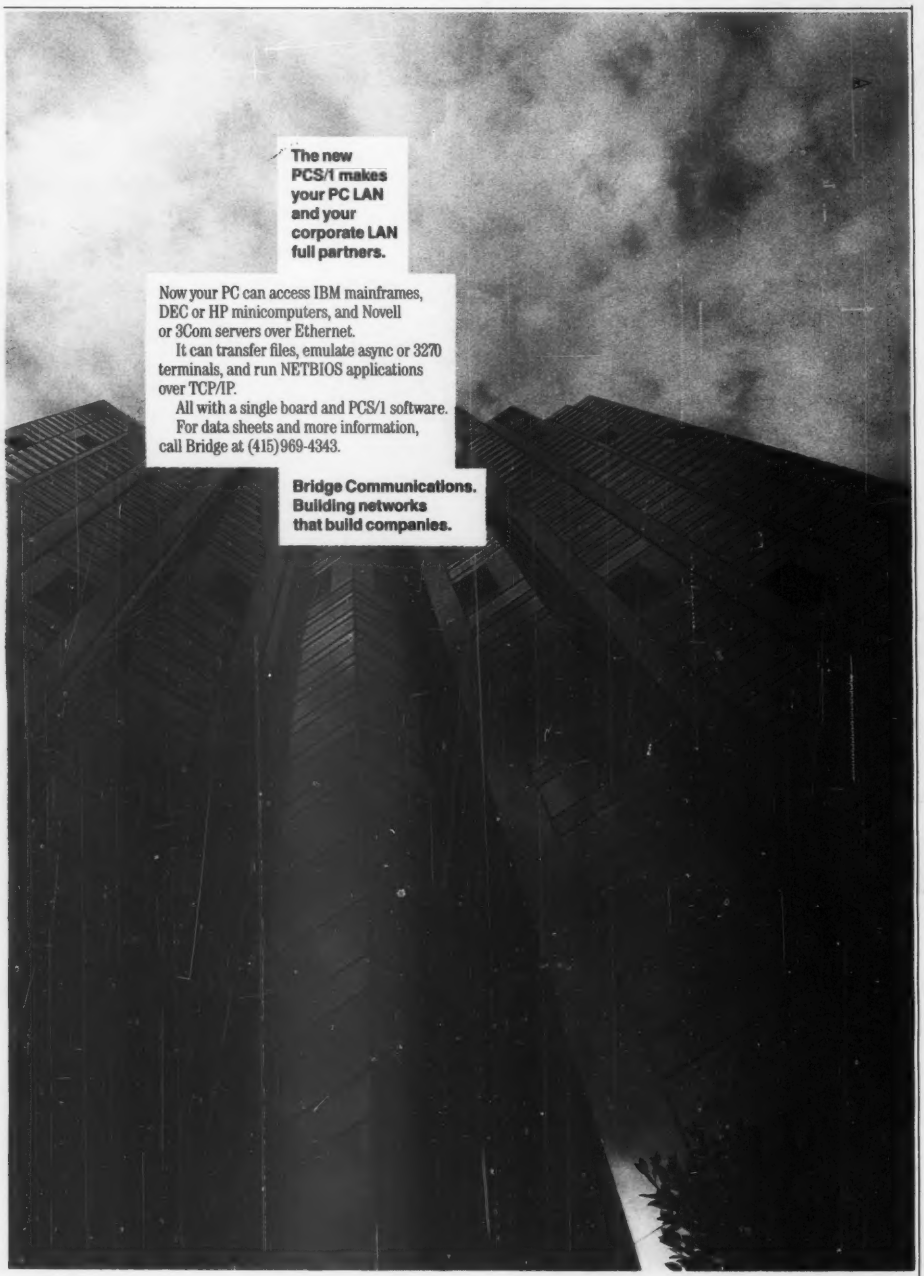
Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

A software enhancement to the **Gammafax** communications product that will allow personal computer users to send Autodesk, Inc.'s Autocad documents via telephone lines to any Group III facsimile machine has been introduced by **Gammalink.**

The Gammafax package consists of a printed circuit board, menu-driven communications software on two diskettes for establishing a direct PC-to-Fax link and a 9.6K bit/sec. modem.

Gammafax with the Autocad interface costs $995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303.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Security devices

A **Call-Back Security Controller** add-on option for **Microcom's** High Density Modem System (HDMS), designed to prevent unauthorized access to a host, has been announced by the vendor.

The self-contained board plugs into a standard HDMS chassis. It provides three types of callback security including fixed callback, variable callback and pass-through access. In all three modes a threshold alarm detects repeated attempts to access the system with invalid ID numbers or passwords.

The controller can handle a data base of 1,000 user IDs and supervise up to 192 HDMS modems. In addition, it outputs a usage report that provides a one-line audit trail of each call.

The HDMS Call-Back Security Controller is priced at $4,499.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062.

A biometric authentication system that acquires and analyzes fingerprint data to prevent unauthorized access to computer systems has been announced by **Thumbscan, Inc.**

The **Thumbscan** system consists of a fingerprint scanning device connected to the user workstation and software installed in the host computer. During logon, the host software scans the user's thumb or finger, then digitizes and encrypts the fingerprint. Enrollment is provided within five minutes and authentication within five seconds.

The Thumbscan system interfaces with IBM PC-DOS and mainframe environments, Digital Equipment Corp. VAX and certain access-control systems. The security device costs $995, mainframe software costs $9,500 and minicomputer software costs $5,500.

Thumbscan, Suite 800, Two Mid-America Plaza, Oakbrook Terrace, Ill. 60181.

Modems/Multiplexers

Universal Data Systems has announced the **Model 9600** Trellis A/B microprocessor-designed data modem and the **Model SW56** Terminal Interface Unit.

The Model 9600 modem is said to operate synchronously over four-wire private lines or the dial-up Public Switched Telephone Network at 9.6K and 4.8K bit/sec.

The Model SW56 Terminal Interface Unit is a combination Data Service Unit/Channel Service Unit with an integral automatic dialer. It provides full-duplex serial, synchronous data communications at 56K bit/sec.

The Model 9600 Trellis A/B costs $1,995. The Model SW56 Terminal Interface Unit costs $1,595.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

A modem designed for point-to-point or multipoint use has been introduced by **Anderson Jacobson, Inc.**

The **AJ 9601-STF** meets CCITT V.29 specification and provides full-duplex, synchronous operation over four-wire, unconditioned leased lines. It offers fast-poll capability and a downline loading

Continued on page 79

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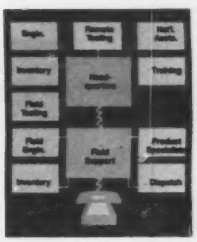

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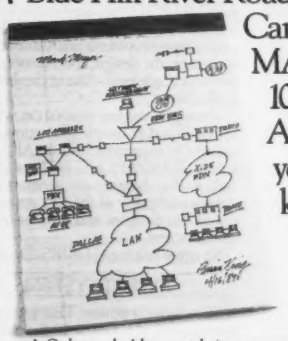

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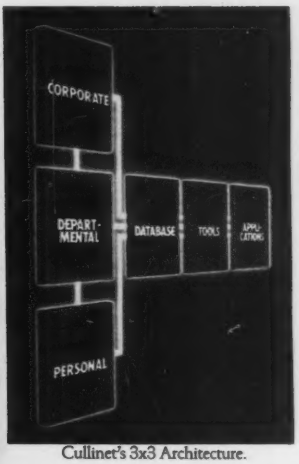

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California, September 27-October 1, 1987, by calling 1-800-551-4555.

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Sunnyvale, CA 94088-3470

The *AJ 9601-STF*

Continued from page 74
feature that allows remote modems to be configured, the vendor said.

Features include an automatic adaptive equalizer; recalling factory option settings; selecting point-to-point or multipoint operation; setting the carrier-detect level; and standard diagnostic tests.

The modem costs $1,695.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

The **4600/PC** family of internal IBM Personal Computer-compatible variable-speed modems has been announced by **Case Communications, Inc.**

The 4600/PC modems meet the CCITT V.22bis standard for data transmission over leased and dial-up telephone lines. They are also compatible with the Hayes Microcomputer Products, Inc. PC AT command set.

The 4624/PC modem transmits data at 2,400 bit/sec. and can operate in full- or half-duplex mode. The 4648/PC operates at 4.8K bit/sec. and the 4696/PC modem operates to 19.2K bit/sec. over dial-up lines.

Prices for the 4624/PC, 4648/PC and 4696/PC are $699, $799 and $1,749, respectively.

Case Communications, 7200 Riverwood Drive, Columbia, Md. 21046.

Benchmark tests for evaluating and comparing nonstandard asynchronous 9.6K bit/sec. modems have been developed by **Racal-Vadic.**

"The 9,600 bps Asymmetrical Modem Benchmark Report" is available from Racal-Vadic and discusses the methodology and results used to test three modems: Microcom, Inc.'s AX9624C, Racal's 9600VP and Telebit Corp.'s Trailblazer.

The report discusses how to properly evaluate the modems, revealing the strengths and weaknesses of competing technologies under real-world conditions. Included is a tutorial covering 9.6K bit/sec. standards, error control, buffer management, link protocol and data compression.

Qualified individuals interested in verifying the test results can use Racal-Vadic facilities.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

A fiber-optic, modular, time-division multiplexer, designed to transmit different signal formats onto a single fiber-optic link, has been introduced by **Astrocom Corp.**

The **Megapath Series 5000 Multiplexer** provides 14M or 28M bytes of information multiplexing transmissions from IBM controllers, synchronous, asynchronous or T1 sources.

When fully equipped, the multiplexer can support up to 128 IBM connections, 72 RS-232, eight T1 channels, 16 V.35 channels or any combination of these, according to the vendor.

It has a typical transmission distance of 3 to 4 kilometers and can accommodate up to four I/O modules.

The multiplexer supports fiber-optic cable sizes of 50/125, 62.6/125, 85/125 and 100/140 microns.

A typical unit, which supports 64 IBM terminals, costs $4,950.

Astrocom, 120 West Plato Blvd., St. Paul, Minn. 55107.

A combination statistical multiplexer, switching multiplexer and private branch exchange has been introduced by **Datatel, Inc.**

The **DCP5032** is available in eight- and 16-channel models.

It features console control, front-panel control, downline loading, flow control, automatic speed recognition, camp-on, built-in diagnostics and a separate printer port.

As a statistical multiplexer, it concentrates up to eight or 16 asynchronous inputs over a single output link.

Inputs may be dial-up or dedicated, operating at speeds from 50 to 19.2K bit/sec.

The DCP5032 costs $2,650 for the eight-channel model and $3,650 for the 16-channel model.

Datatel, Cherry Hill Industrial Center, Pine Oak and Springdale Roads, Cherry Hill, N.J. 08003.

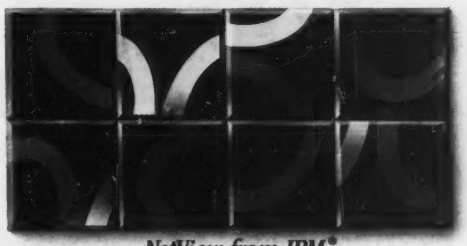
Split-channel operation on rack-mount cards has been announced by **Gandalf Data, Inc.** for its LDM family of stand-alone medium-distance modems.

The split-channel option allows two-channel operation per modem in rack-mount form. The cards are available with split-channel operation capabilitiy in dual-card configuration or single-channel cards with retrofit capability.

The modems operate full duplex over four-wire voice grade leased-line circuits at speeds of 9.6K bit/sec. or 4.8K bit/sec., depending on the card. Up to seven dual rack-mount cards can be accommodated in the standard Gandalf LDS 3000 chassis.

Prices range from $995 to $1,095 for the dual rack-mount cards.

Gandalf Data, 1020 S. Noel, Wheeling, Ill. 60090.



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COMPUTERWORLD

INSIDE

In Depth — Sizing up IBM's manufacturing empire. Page 69.

...duction-oriented VM/XA

...for multiple operating systems

...of XA hardware, ...2000s,

SYSTEMS & PERIPHERALS

Users say DPS 7 top system

...urvey shows Honeywell boosts overall satisfaction; Amdahl posts gains

BY JAMES CONNOLLY
CW STAFF

...ELRAN, N.J. — Once ... the lowest ranking ven... for in user satisfaction, Honeywell Bull, Inc. ...ntinued a climb to the ...P, where it joined Amdahl Corp. at the ...d of the list, in the ...7 Datapro Research Corp. report on main... user satisfaction.

Honeywell Bull's gains ...came from the strength ...of its DPS 7 small main... ...ame and took place ...r years after the com... ...ny sat at the bottom ...overall satisfaction ...983.

Five of the six ven... ...ors rated by users re... ...eived higher overall ...isfaction scores than ...y did in the 1986 sur... The only company ...saw its score slip ...Unisys Corp., ...scored better as ...phs Corp. in 1986 ...the combination ...ghs and Sperry ...s year. How... ...s had the dis... ...posting some ...scores and ...worst re... ...larly with ...system (3.65).

...tioned in ...Honeywell Bull, with a ...ponses. ...leading corporate satis... ...individual faction score of 3.38, did ...special not fair as well ...eywell DPS 8...

faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes as part of the i4th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst Marilyn Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, climbing from a 3.3 overall satisfaction rating to 3.59 rating for among systems mentioned by 20 or more users. The DPS 7 also scored well in ease of operation (3.59), reliability of the mainframe (3.72) and operating system (3.65).

Honeywell Bull, with a leading corporate satisfaction score of 3.38, did not fair as well ...

areas suchs as ease of operation (3.62), reliability of the mainframe and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users.

NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.13.

Unisys systems and the corporation as a whole posted the highest scores or tied for the highest in 17 categories, with the high-end A 15 mainframe, used by eight respondents, leading 10 of those categories. On the negative side, Unisys had the lowest scores in 21 areas, with the nine users of the Unisys 1100/60 and eight users of the Unisys B7900 combining to provide 18 low ratings.

Users of NCR ...ment gr...

of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected as trend in the pattern of system acquisition; only 52% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 32% of the users said they lease systems from third parties.

Courtney also reported that main memories continued to increase in the mainframe market. The number of systems with more then 64M bytes of memory rose from ... in 1987 to 7...

53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, surpassed expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth stunted

Communications expansion had moved ahead of hardware growth last year.

Sharp drops showed up in connection with software needs ... quisition ...

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Nothing beats word of mouth advertising. And the word being spoken by users of Honeywell Bull systems is "satisfaction."

In a recent Datapro Research Corp. report, Honeywell Bull scored highest in overall user satisfaction.

Not second highest, or third highest.

Highest.

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And users gave our DPS 7 mid-range computer high marks for its ease of operation and reliability. They also praised its operating system, GCOS 7, that allows it to perform a wide range of functions, such as high-volume transaction processing, office applications, sophisticated networking and communications, and program development. In short, they rated the DPS 7 the best system available.

Again, not second best or third best.

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Honeywell Bull

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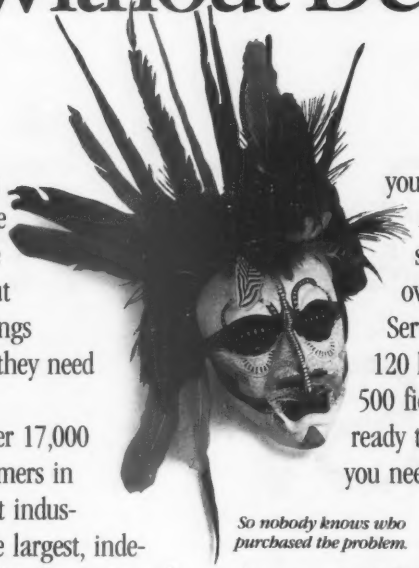

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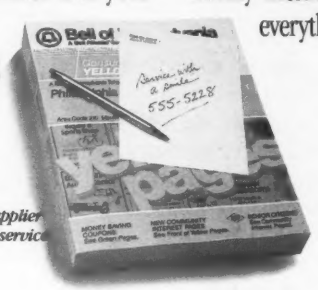

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HARD TALK

James Connolly

Competition heats up

Now, things get serious. The rivalry between IBM and DEC is intensifying daily — and will continue to flare.

While users will see IBM and DEC knock heads in bids pitting IBM 3090 mainframes and 4381 intermediate systems against DEC's VAX 8000 family, the real heat will be at the departmental level and in networking and software.

The networking and software arguments are not new: Both vendors stake claims to ease of use, compatibility and connectivity titles. Those claims are almost impossible to quantify, except through years of experience by users.

But there is something new in the DEC and IBM claims regarding departmental systems. Two companies that insist they do not publicly comment on competitors are spending a lot of time doing just that.

IBM's 9370 came up for discussion a half-dozen times in a press conference two weeks ago. But it was a DEC — not an IBM — show. Meanwhile, IBM may match *USA Today*'s circulation with brochures compar-

Continued on page 86

DEC's service network grows

BY JEAN S. BOZMAN
CW STAFF

COLORADO SPRINGS — Digital Equipment Corp. has fashioned what it says is a state-of-the-art remote-maintenance network that extends around the world and is anchored in a building at the base of the Rocky Mountains.

Inside the sand-colored Customer Support Center (CSC), which has a view of nearby Pike's Peak, 130 hardware specialists and 300 software specialists collectively field 3,500 calls a day from customers throughout the U.S. A customer's call to an 800 number gets him on-line with one of DEC's Colorado specialists, but often the problem ends up being resolved via an electronic connection with another DEC facility in the U.S. or abroad.

DEC's diagnostic capability resides in the 14 CSCs that it maintains around the world, including sites in France, England, Japan, Australia and Canada. There are three centers in the U.S., including the 350,000-sq-ft Colorado facility, which maintains the largest library of product specifications within DEC. A center in Atlanta, staffed by 220 specialists, handles most office systems-related questions, including those regarding DEC's All-In-1. A third center in Westboro, Mass., fields difficult VAX-related questions.

A series of software products, each with expert system features, allows the Colorado specialists to pinpoint failing hardware via a phone connection with a customer's machine.

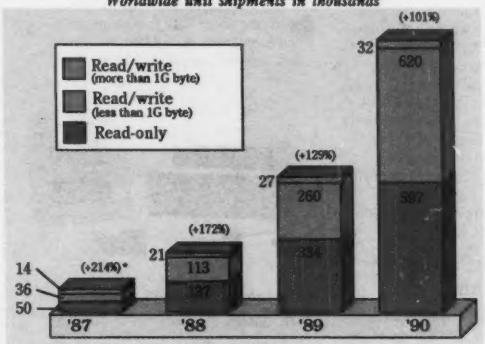
DEC is not alone in this remote-diagnostics capability. IBM, AT&T and other major vendors provide remote diagnostics, although each takes a different approach. One thing that sets DEC's maintenance software apart is that it can predict which hardware faults may become critical and take the affected units off-line before they crash, according to Dave Lindsey manager for the Netsupport

Continued on page 90

Data View

Optical disk drive market expands

Worldwide unit shipments in thousands



* Numbers in parenthesis indicate percentage of growth

INFORMATION PROVIDED BY DISK/TREND, INC.
CW CHART

Beehive adds terminals

IBM 3190 compatibles boast 3K-byte memory

BY STANLEY GIBSON
CW STAFF

SALT LAKE CITY — Beehive International recently introduced three terminals, the 191D, 192D and 192F, that are plug-compatible with IBM 3191 and 3192 models announced earlier this year.

The terminals include a record/playback/pause feature that contains 3K bytes of nonvolatile memory, approximately twice that offered by IBM, ac-

Continued on page 84

Vaxstation toasted, but . . .

BY JAMES CONNOLLY
CW STAFF

Digital Equipment Corp. bolstered its claim to one of the lead positions in the bitterly fought workstation game with the recent introduction of its most powerful Vaxstation systems.

Analysts interviewed after DEC announced its Microvax-based Vaxstation 3200 and 3500 agreed that DEC at least narrowed any performance gap that existed between earlier Vaxstations and workstations made by Sun Microsystems, Inc. and Apollo Computer, Inc.

While those analysts generally declined to endorse any of the three vendors as the price/performance leader, they said DEC's offering of 3-million-instruction-per-second (MIPS) Vaxstations makes those DEC machines competitive with Sun and Apollo's 4-MIPS systems.

DEC is making steady progress in the workstation field —

Continued on page 87

Inside

- EMC uncages Falcon subsystems for HP 3000s. Page 84.
- California Peripherals puts intelligent formatters in tape-cartridge drives. Page 86.
- Talaris Systems unwraps laser print station. Page 92.

► IBM 3270 and System /34/36/38 Users:

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Telex: 810-223-6058

EMC ups subsystems' capacity

BY STANLEY GIBSON
CW STAFF

HOPKINTON, Mass. — EMC Corp. recently introduced two disk drive subsystems, the Falcon 5000 and Falcon 8000, providing up to 1.25G bytes of storage for Hewlett-Packard Co. HP 3000 computers.

The Falcon 5000 provides 625M bytes of storage, and the Falcon 8000 offers 1.25G bytes of storage. Using three Falcon 8000 subassemblies, users can reportedly configure up to 3.75G bytes of disk storage in a single cabinet. Other Falcon products, the Falcon 1 and the Falcon 2, store 406M and 812M bytes, respectively. All Falcon series disk drives include 4M bytes of cache, according to EMC.

"A number of our 812M-byte [machine] customers expressed a need for even greater mass-storage capacity per drive. Now, EMC has brought disk densities normally associated with large mainframes to HP 3000 users," EMC senior product manager Joseph Gately said in a prepared statement.

The subsystems are 100% compatible with HP's MPE operating system and HP diagnostic procedures, according to the vendor.

Seek time of 15 msec

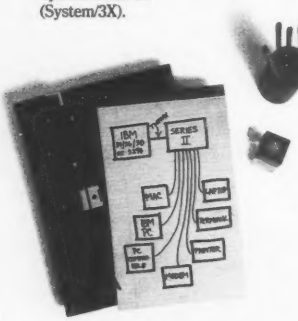
EMC reported that the average seek time for the new disks is 15 msec and that the average data-transfer rate is 2.46M byte/sec.

The Falcon 5000 and Falcon 8000 subassemblies each contain a NEC Corp. disk drive and an EMC controller. The controllers used on the new drives are the same as those sold with the Falcon 1 and Falcon 2.

The Falcon 5000 and 8000 subsystems are being shipped, EMC said. The Falcon 5000 is priced at $19,500, and the Falcon 8000 costs $33,500.

See how your IBM 34/36/38 can support more of the peripherals you want, with the right support from KMW.

Take full advantage of your IBM 34/36/38 by linking it to your peripheral devices. KMW's Series II Twinax and Series III Twinax protocol converters provide a reliable, inexpensive method for connecting a variety of micros, terminals and printers to an IBM System 34/36/38 (System/3X).



The multi-port Series II Twinax provides a cost-effective method to connect up to seven asynchronous devices to your System/3X. The single-port Series III Twinax gives you the same proven features as the Series II, without paying for more ports than you may need. Both allow local connection or remote connection via dial-up modems.

Communicate with a wide range of microcomputers and terminals, including Macintosh.

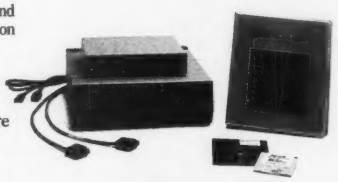
Apple Macintosh. IBM PC and compatibles. Laptops. ASCII terminals. All of these can be connected to your System/3X with a KMW protocol converter, and they will appear to the host as 5251/5291 terminals.

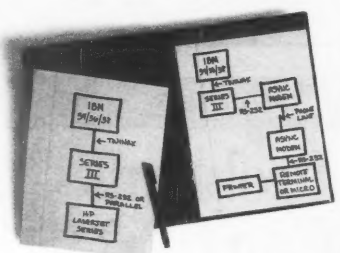
Files can be transferred by using KMW's free terminal emulation software on your PC or Macintosh and PC Support 36/38 or ETU software on your System/3X. This powerful file transfer feature allows you to use System/3X data in popular packages such as Lotus 1-2-3 and Microsoft Excel. Plus, an error-checking feature ensures flawless file transfer.

Connect to just about any printer you want.

Printers attached to the Series II or Series III appear to the System/3X as IBM 5225 or 5256 printers. Most popular printers are supported, including many from Epson, Xerox and C.Itoh. Additionally, the 5219 emulation feature of the Series III supports a variety of printers, including Hewlett-Packard LaserJet.

For maximum productivity, the printer pass-through feature allows you to send one set of data to your printer while you work on a different set of data on your terminal or micro.





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Encore adds I/O products

MARLBORO, Mass. — Encore Computer Corp. has announced an I/O subsystem designed to improve I/O performance by 50% to 100% and to more than double the on-line storage capacity on its Multimax family of parallel processors.

The company introduced the FDDN disk drive with a capacity of 655M bytes and a price of $22,500. Encore also announced the LDC disk controller, which supports up to four drives and features overlapped seeks between drives on a controller and overlapped operations between controllers on a channel.

Encore officials said the FDDN drive provides a 17% reduction in cost per megabyte when compared with Encore's earlier drives.

Beehive

FROM PAGE 83

cording to Dick Hodge, Beehive's marketing vice-president. The memory can be dynamically allocated to 24 programmable function keys, the same as on comparable IBM terminals, Hodge said.

The features allow users to shorten logon procedures and change the terminal's configuration with a single keystroke, he explained.

The 192F, which Beehive calls its flagship product, is a color terminal that has a 132-col. display, as does the IBM 3192F announced in June.

Beehive distributes only through value-added resellers, OEMs and systems integrators.

The 191D carries a suggested retail price of $1,350; the 192D is listed at $1,580; and the 192F has a suggested retail price of $2,012. Each suggested price includes a three-year warranty. The terminals are available now, according to Beehive.

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California Peripherals readies half-height drives

TORRANCE, Calif. — California Peripherals Corp. recently announced half-height 125M- and 150M-byte ¼-in. tape cartridge drives that include intelligent formatters.

Customers may adapt the CP-125E or the CP-150E tape drives to the QIC-02, QIC-36 or small computer systems interface (SCSI) standards, according to Howard Wing, vice-president of marketing and sales. The drives include a head mechanism that can adjust to compensate for irregularities in the data track on the tape.

The drives were designed by California Peripherals and manufactured by The Nakamichi Corp. in Tokyo.

California Peripherals was founded in September 1986 by President Yoshi Noguchi and Wing, who both formerly worked for Storage Technology Corp. California Peripherals sells its products, which include IBM 3480-type tape cartridge drives, to OEMs.

Shipping in March

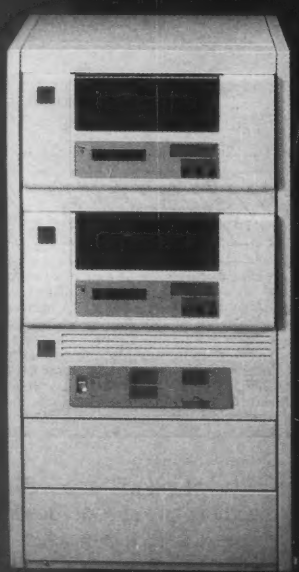
The company will reportedly ship CP-125E and CP-150E units for evaluation in November and will ship volume quantities in March. Prices in OEM quantities range from $475 to $525 per unit, depending on the interface selected.

California Peripherals also announced the CP-150, which supports the QIC-150 recording format.

Priced at $390 per unit for OEM volumes, the device is scheduled to be produced in volume in November.

System 38, 4300, 9370 Users:

When it comes to price/performance of tape drives, only one system stacks up.



Introducing the 6800 Series tape subsystem from IPL. The 6800 provides a new level of tape drive performance for mid-range IBM processors. And its small size, low power and cool, quiet operation means the 6800 is ideal for office environments.

Our new rack mounted subsystem features an IPL intelligent controller, one or more tape drives, and room for future upgrades. Compared to other subsystems, here's how the 6800 stacks up. For backing up your system, it operates twice as fast as an IBM 3430. Yet it costs considerably less.

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Competition

FROM PAGE 83

ing the 9370 with DEC systems. In addition to the oneupsmanship and public preening, there is a key benefit for users in DEC vs. IBM. That is a flood of better products.

The pressure was on DEC to put some horsepower in its third-generation Microvax systems. The Microvax II, which reportedly responded like a tortoise when saddled with more than 20 active users, became a focus for competitors the way IBM's System/36 had been targeted by DEC.

The Microvax 3500 and 3600 have addressed the performance complaints by tripling the power of the Microvax II. The new Microvaxes will be DEC's low-end platform for quite a while. It is only a matter of time before DEC moves the technology downward to replace the less expensive Microvax 2000 and Microvax II.

Meanwhile, don't be surprised if IBM cuts prices or otherwise improves price/performance figures for the 9370 family. Now that DEC has played its hand, IBM sees the parameters in which to work if it cuts prices or provides a performance kick.

In addition, IBM has its System/36 and 38 follow-on product in the wings for second-half 1988 delivery. Some view that product, code-named Silverlake, as the true VAX-killer. Its debut will likely launch a new wave of counterthrusts.

The bottom line is that lower mid-range systems now provide more power at less cost than ever. And those price/performance figures can only get better as the years pass.

Connolly is *Computerworld's* senior editor, systems & peripherals.

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Vaxstation

CONTINUED FROM PAGE 83

in which DEC President Ken Olsen acknowledged his company got a late start — but still must overcome several barriers, the analysts said.

The DEC workstation group's principal shortcoming is in the area of three-dimensional graphics, according to Vicki Brown, an analyst with Framingham, Mass., market research firm International Data Corp. (IDC), and Charles Foundyller, president of Cambridge, Mass., market research group Daratech, Inc. Both said they expect DEC to address the need for high-performance graphics.

Analyst Craig Symons of the Gartner Group, Inc., a market research firm in Stamford, Conn., added that DEC, which has promoted use of its minicomputer-oriented VMS on the Vaxstation, "still has to wake up and recognize that Unix is the de facto standard in the workstation market."

Meanwhile, Symons said the most recent Vaxstation introductions are one more step in a "well-thought-out strategy by DEC to dominate the workstation market."

Symons said the first step was to cut prices, which DEC did on its Vaxstation 2000 products in June. "The second step was to get the performance, and, basically, with the Vaxstation 3000 series, they cut the performance gap," he added.

Mixed news for competition

Symons also noted that DEC's announcement contained both good and bad news for Apollo and Sun. He said Sun is left to explain why it scored poorly — being outscored by Vaxstations that cost 60% as much as its Sun-3/260 on a suite of 58 benchmarks. But he added that Apollo's DN4000 "looked like a rather nice machine," even in the DEC tests.

Meanwhile, IDC's Brown reported that users evaluating DEC, Sun and Apollo machines with their own applications are likely to find all three providing about the same price/performance levels.

Daratech's Foundyller also said that the Vaxstation 3200 and 3500 appear to offer performance comparable to that of the Sun-3/260 and Apollo DN4000, which are based on Motorola, Inc. 68020 microprocessors and had previously made Microvax-based workstations "look pretty poor."

Foundyller called the most recent DEC announcements good news for DEC users and said that users who had standardized on the VAX family had been vindicated. He said the new Vaxstations will help DEC protect its user base from incursions by Sun and Apollo, although he speculated that DEC is unlikely to use the new systems to steal existing Sun and Apollo customers.

But Foundyller also raised questions about the benchmarks released by DEC and its competitors. "I found it interesting that the consultants and users who DEC said ran the tests didn't come forward," he noted.

Foundyller called for an independent means of measuring workstation performance. He complained that "performance posturing" is common in the computer industry and suggested that a body such as IEEE set up a benchmarking procedure.

"It's high time we had less hype and hot air and more facts," he said.

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You're invited to celebrate the arrival of the newest member of the Unisys product family, as well as the birth of a new concept: The Unisys Smallframe.

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But each starts you running true mainframe applications economically and quickly. Plus, Smallframes use the same operating system as our biggest A Series mainframe—and every machine in between—without any software conversion. (That's what we meant by "frame." As in main*frame*.)

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The A1, A4 & A6 are the youngest and smallest members of the respected Unisys family of A Series mainframes. The series includes machines that run major banks, governments, schools, hospitals and businesses all over the world. An independent survey of mainframe owners found Unisys systems scored the highest five year average in overall satisfaction.*

While Smallframes are about the size and price of minis, the top of the A Series isn't a set of minicomputers playing together. It's the A15, one of the largest and most powerful true mainframes money can buy.

Between the A15 and the A1, there are 12 other models.

Computerworld, June 15, 1987, survey by Datapro Research Corporation.

All compatible over the line—and over time. Software written for any model or generation over the last 17 years is compatible with any current A Series model.

Since all three are built for the same size cabinet, the A1 itself is field upgradeable to A4 and A6 levels—a better than 3 times increase in computing power.

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But what about the rest of the A Series? From the moment of conception, every computer in the family is designed to be easy to get along with and cost very little to run.

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All in all, the best thing about the Smallframe is that it sees the world the same way the powerful A15 and the whole A Series does. You might even call it a "chip off the ol' box." It's got the same operating system. Same interfaces. And it will even communicate with IBM machines.

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DEC service

CONTINUED FROM PAGE 83

service within DEC's Field Networks Services Group. The predictive software was developed in a CSC laboratory.

Now, DEC may be prepared to sell some of its preventive maintenance software expertise, industry experts say. Francis Dzubeck, president of Communications Network Architects, Inc., says DEC may soon announce the availability of some of its internally used preventive maintenance routines for sale to users.

Many users do not realize the operating system in their DEC machine is cataloging all system errors and that patterns in the errors can pinpoint the cause of a system failure, says Ronald Ochoa, an engineer in DEC's Customer Integrated Systems Group.

DEC's Customer Support Center *sits at the base of the Rocky Mountains.*

At the Colorado center, DEC software engineers rely on several tools to unlock the patterns of the cataloged errors stored under VMS and other DEC operating systems. To examine an ailing VAX system, the Colorado specialists, each wearing a telephone headset, summon a kit bag of software tools. Most problems are resolved in 45 minutes or less — a record comparable to that of IBM's call-in service, according to several analysts. In DEC's customer base, 60% of the problems are associated with software and 40% with hardware failures.

Now, variants or parts of these maintenance programs may become available to users. The software used by the Colorado center includes the following:

- The Storage and Retrieval System (Stars), which is a compendium of 70 technical data bases including 20,000 technical facts on DEC hardware and software. Stars was developed as a single gateway to thousands of possible causes of system errors. "The idea is that no one can know everything," says DEC's Jeff Robbins, who designed Stars. "We designed Stars so that a specialist could have access to the shared experience of all our field service specialists."
- The Summary and Retrieval Module (Spear), which resides in the customer's system and allows CSC specialists to look at the error record stored in the customer's machine. "Spear allows us to connect to the system and to retrieve only the errors related to that system," Ochoa says. Customers may buy a basic version of Spear, but an extended version with built-in analytic tools is used at the center here.
- Vaxsim, which allows engineers to visualize the problem on a node-by-node basis. The Vaxsim program presents a screen of boxes, each representing a logical subsystem, such as a disk drive, printer or CPU. The display shows the number of errors logged for each device and the safe, or threshold, level of errors.

Voice interfaces interplay

Advanced interfaces in the DEC diagnostic tools play a key role in the CSC's operation. Many tools make intensive use of color to indicate the levels of failure. A Dectalk synthetic voice interface alerts the three network managers of the CSC's own Ethernet/Decnet network to impending or existing system breakdowns. The voice interface, known as Diana, calls a network manager on a beeper and identifies system faults through coded numbers on the beeper's display.

A subset of Stars can be used with DEC's Digital Software Information Network and is being readied for user applications, says Robbins, who works in the center's Advanced Projects Development Group. He explains that the CSC will retain the full repository of 20,000 technical articles on all supported DEC products. Users will benefit from dial-up retrieval of the central DEC data base.

Stars is one of several sources of expert system assistance for users, according to Robbins. "We're taking some of the artificial intelligence out of Spear and putting it into Vaxsim," he says. "That way, a customer can read us numbers, and we won't always have to connect to his system to see what's wrong."

DEC may want its customers to preprocess some of their own maintenance problems, Dzubeck suggests. That would not be far different from IBM's own Customer Service Amendment, which gives customers discounts for doing on-site maintenance themselves.

DEC has been working to reduce the time it takes to get problems resolved and to increase the number of jobs handled by any given specialist. The push comes from the fact that DEC's maintenance operation is run as a profit-and-loss business, Lindsey says, noting that maintenance provides 20% to 30% of revenue.

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NEW PRODUCTS

Processors

A custom VMEbus memory board called the **PME CRR-2** has been introduced by **Plessey Microsystems.**

The board is said to provide six 32-pin sockets to accommodate static random-access memory, erasable programmable read-only memory (EPROM), enhanced EPROM, PROM and ROM devices.

The CRR-2 is divided into four banks of four devices each, with each bank separately configurable to contain 28- or 32-pin JEDEC-standard devices. According to a company spokesman, this provides storage capacities from 128K to 16M bytes.

The CRR-2 is priced at $700, complete with battery and ready for installation of memory devices.

Plessey Microsystems, One Blue Hill Plaza, Pearl River, N.Y. 10965.

A memory board, available in either 4M- or 8M-byte capacities and said to emulate multiple Data General Corp. 8708 memories for use in that firm's 32-bit MV/6000 and MV/8000 processors, has been announced by **System Controllers and Interface Products.**

The **MV680** memory features low power consumption by utilizing F logic and by providing either 4M or 8M bytes on one board.

The starting memory address is selectable in 1M-byte boundaries via a four-position board-edge switch.

Other features are a board de-select switch, which removes the memory from the system, and LEDs, which indicate memory power on and memory selected.

The 4M-byte MV680 costs $2,750, and the 8M-byte MV680 costs $5,850.

System Controllers and Interface Products, 449 S. Beverly Drive, Beverly Hills, Calif. 90212.

Data storage

A quarter-in. tape cartridge duplication system said to copy up to four cartridges at the same time from a single master on a hard disk has been announced by **Mountain Computer, Inc.**

According to the vendor, the **Image-copier System** can duplicate tapes regardless of the host operating system. It is available in QIC-24 and QIC-11 formats. Typical throughput for a 60M-byte cartridge is said to be about 12 min.

The system keeps a count of each tape copy made and features a read-after-write verification procedure.

The user can request a byte-by-byte comparison between the master tape and duplicate tape.

The system costs $40,000.

Mountain Computer, 360 El Pueblo Road, Scotts Valley, Calif. 95066.

A disk controller designed for interfacing up to four ST506/412 Winchester disk drives to Digital Equipment Corp.'s Microvax, MicroPDP-11 and LSI-11 computers has been announced by **Distributed Logic Corp.**

The **DQ616** controller is contained on a single dual-height board. It is said to be fully compatible with DEC's Mass Storage Control Protocol driver contained in the MicroVMS, RT-11, RSX-11M+ and Ultrix operating systems.

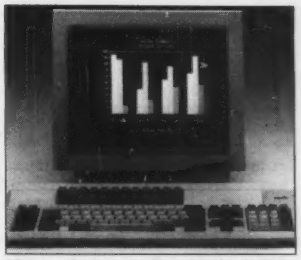
Features include an on-board formatter, an 8K-byte buffer and a command-queue buffer. It supports overlapped seeks for up to four ST506/ST412 or DEC RD51 and RD52 drives. It supports 16-, 18- and 22-bit Q-bus addressing and both block and nonblock mode memory.

The DQ616 costs $1,150.

Distributed Logic, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Terminals

A family of workstations said to be compatible with the IBM 3196 and 3197 display stations.



The Lynk Corp.'s *Lynkstation/196.*

Features include a 15-in. green or amber screen, a choice of 83-, 102- or 122-key keyboards, menu-driven configuration and setup and compatibility with the IBM System/34, 36 and 38 processors and the IBM 5294 Remote Control Unit.

The Lynkstation/196E can be configured to run concurrent dual sessions or to drive ASCII printers as system-addressable printers.

The Lynkstation/196 costs $1,250. The Lynkstation/196E costs $1,550.

Lynk, 101 Queens Drive, King of Prussia, Pa. 19406.

Model D has been announced by **The Lynk Corp.**

The **Lynkstation/196** family emulates the 3196 and IBM 5291 and 5292

Stereographics Corp. has introduced the **Z-Screen** liquid crystal modulator, an

Continued on page 92

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Continued from page 91

enhancement to its camera and graphics systems that enables stereoscopic three-dimensional images to be viewed using polarizing glasses.

Stereographics systems provide an unambiguous display of foreground and background objects along the Z axis.

The Z-Screen modulator, which is fitted over the front of the monitor, encodes the left and right viewpoint images.

Polarizing glasses worn by the viewer pass the appropriate image to each eye, creating the stereo 3-D effect.

The Z-Screen is available in sizes up to 19-in. diagonal.

Prices start at $5,900.

Stereographics, P.O. Box 2309, San Rafael, Calif. 94912.

Printers/Plotters

Two flexible-membrane ASCII-encoded keyboards designed for use in harsh environments have been announced by **Cardinal Technologies, Inc.**

The **KB670** is a 58-key typewriter-format keyboad with two user-definable key-switch closures. It is fully encoded with the 128-char. ASCII alphanumeric character set.

The **KB675** adds a 16-key calculator-format numeric keyboard to the typewriter keyboard.

The KB670 costs $199, and the KB675 costs $239.

Cardinal Technologies, New Holland Ave., Lancaster, Pa. 17604.

A 15 page/min laser print station has been announced by **Talaris Systems, Inc.**

The **1590 Printstation** features a controller, called the Talaris 1590 Printstation Control System, with two processors. One processor does raster image processing, and one manages I/O and interprets commands. The print station offers from 3M to 5.5M bytes and uses the vendor's Extended Commands Language.

Other features of the print station include a small computer systems interface, 40 fonts stored in read-only memory, two 250-sheet paper trays and a 500-sheet facedown output tray.

The 1590 Printstation costs $8,490.

Talaris Systems, P.O. Box 261580, 6059 Cornerstone Court W., San Diego, Calif. 92126.

Power equipment

A 1,000VA compact uninterruptible power supply (UPS) system has been introduced by **Isoreg Corp.**

The **FRO Series Continuous Online UPS** is said to protect against voltage spikes, surges and sags, brownouts and blackouts. It incorporates a static bypass circuit that transfers the load to utility power in case of a momentary overload beyond the UPS's rating. The UPS can supply power for 12 to 30 min during a utility power outage.

The 1,000VA UPS for operation at 120V and 60Hz costs $2,450. A 50Hz, 220V version costs $2,572.

Isoreg, P.O. Box 486, 410 Great Road, Littleton, Mass. 01460.

Auxiliary equipment

A unit designed to provide access for channel monitors or logic analyzers to multiple mainframe I/O channels has been introduced by **Technology 80, Inc.**

The **Model 2020 Channeltap**, is said to provide access to any of up to four channels, without the user having to swap the monitoring device from channel to channel or bring down the host mainframe system prior to connecting the monitor.

Up to five Channeltaps may be daisy chained together, providing a monitor with access to any of up to 20 channels. The Channeltap connects to mainframe I/O channels using regular channel tag and bus cables.

According to the vendor, the Channeltap is totally passive.

The Model 2020 Channeltap is priced at $4,000.

Technology 80, 658 Mendelssohn Ave. N., Minneapolis, Minn. 55427.

Input devices

An enhanced version of the **Model 2100** series hand-held fixed-beam laser diode scanner has been announced by **Photographic Sciences Corp.**

Model 2100 *laser diode scanner.*

The 2100 series features integrated decoding. According to the vendor, it will read Code 39, the full ASCII character set, Codabar, the Universal Product Code and other codes. Models with the elliptical beam are said to be suited to read dot matrix bar codes.

Enhancements include lower power consumption, the ability to interface with most data collection devices and a user-friendly configuration.

The Series 2100 hand-held scanner is priced at $395.

Photographics Sciences, P.O. Box 338, 770 Basket Road, Webster, N.Y. 14580.

It only takes a minute to prove we're four times faster than IBM.

Give the MegaLine™ Mod 5225 Ion Deposition Printer a minute and it'll give you 1,980 lines. That's four times more than IBM's 5225 can print.

In just one month, MegaLine can accelerate your printing volume to 150,000 pages. And if you think that figure looks impressive here.

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	IBM 5225	MegaLine Mod 5225
Lines/Min	280-560	2000
Characters/Line	136-198	136-196
Lines/Page	66-88	66-88
Twinax	Yes	Yes
Printer Type	Impact	Non-Impact
Protocol	5225	5225

The fact is, our MegaLine printer is twinax compatible with IBM Systems/36-38.

And if you're concerned about character and line spacing compatibility, relax. MegaLine gives you 10 and 15 characters per inch (cpi), and 6 and 8 lines per inch (lpi). Just like IBM's 5225.

The low cost of high technology. For a high speed, high quality, high print resolution page printer, the MegaLine has remarkably low costs.

Its per-copy cost is less than 2¢.

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Along with its high speed and low costs, our MegaLine has a smaller footprint than IBM's 5225. It's also much quieter.

Now what could be better than that?

Express yourself forty times faster than IBM's 5219. If you want all the features of our MegaLine *plus* electronic forms capability, you can't get any better than the new MegaPro™ Mod 5219 Ion Deposition Printer.

With its unique graphic arts features and proportionally spaced characters, the MegaPro lets you create attractive business forms at a quick 30 pages-per-minute (that's forty times faster than IBM's 5219).

It can manage up to 32 fonts on one page. Store up to six pages of forms at one time. And give you all the tools you need to express yourself—from line drawing and shading to bit-mapped graphics and logos.

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How companies plan

A survey of 17 companies reveals a variety of planning methods but a common theme: Executives do not naturally realize the value of information systems

BY LEILANI ALLEN

What are MIS managers really doing about strategic planning when confronted with new technologies and rapidly changing business requirements? To answer this question, I conducted a survey to discern if and how MIS is developing and promoting methodologies for strategic planning. I was interested in hearing, as one public figure recently stated, "the good, the bad and the ugly." And I did.

One striking finding of the survey is that it is not, by and large, the so-called "information-driven" industries (banking, financial services, high technology, insurance) that use the most innovative approaches to information management.

Instead, many of the most interesting practices are found in the retail and transportation firms. The key determinant in good MIS planning and management seems to be the ability of corporate executives to recognize (or the MIS executive to sell) the value of information and information systems to the corporation's bottom line. The bad news is that this idea does not naturally occur to executives in "information-driven" industries; the good news is that it can occur at any firm.

Another surprising finding is the degree to which MIS executives see themselves as business people first, MIS professionals second. Popular mythology — and a good deal of the current DP literature — still depicts MIS managers as hopeless "technobigots," more enthralled with systems than with organizational or management issues.

This is an absolutely false characterization of the respondents in this survey, although they do vary in the extent to which they have convinced their fellow executives of their business roles. If these results are typical, it means far more MIS executives are willing to be business managers than the businesses themselves will acknowledge or accept.

Another key finding is that a movement is definitely under way to distribute MIS resources into user areas — not computing resources but people resources. The monolithic DP empire may be crumbling, but one cannot look at hardware or facilities to assess this change.

Rather, decentralization is achieved by assigning MIS staff to user areas, permanently or temporarily. This means MIS personnel may ultimately be more likely to report to a regular business manager than to another MIS professional.

This has profound implications on the ways we recruit, train and promote people in the profession.

For years the MIS staff member viewed himself as MIS, first and foremost. His loyalty and commitment were to the profession; his self-esteem was derived from the opinions of his colleagues. Now we take this person and send him to a user area where standards of performance and colleague evaluations are much different. A new self-image and a new identity have to be created to help motivate the decentralized staff.

P. CHARLES LADOUCEUR

The respondents

Seventeen executives from the San Francisco Bay area participated in the survey. Because the respondents were assured of complete confidentiality, this report does not identify an executive or company by name. Some corporate information has been kept deliberately vague, and technology strategies are discussed only for the group as a whole to safeguard potentially competitive information from disclosure.

The respondents are, by and large, senior MIS professionals of more than 20 years experience. With one exception, they are all male. Most are directors or vice-presidents of MIS or the equivalent. None sport the title "chief information officer," although some clearly function in that role. The majority report to a senior executive in finance or administration, although several have direct and routine contact with the president or chief executive officer.

All of the respondents have at least an associate's degree; half have baccalaureates. There is an almost even split between individuals with technical degrees

Allen is a senior consultant with Amdahl Corp. in Sunnyvale, Calif. This article is excerpted from her longer report, "Strategic Planning for Information Systems," published by Knowledge Consortium in Oakland, Calif.

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• Innovators vs. traditionalists

• MIS is ready, willing and able to help plan

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Leader: Atul Kapoor, Vice President, Kaptronix Inc.

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Leader: Haines Gaffner, President, LINK Resources Corp.

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Leader: Len Elfenbein, President, Telcom Systems Group

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Leader: Gabe Kasperek, President, Kazcom Inc.

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Level: Introductory.

T-12 REGULATORY ISSUES AND ANSWERS

Leader: Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

Take this comprehensive seminar to make sense of the increasingly complex regulatory environment. You will receive a thorough briefing on the legal, social and regulatory issues; the evolution of vendor technology and industry standards and significant developments affecting the coming regulatory year.
Level: Intermediate.

T-13 INTRODUCTION TO DATA COMMUNICATIONS

Leader: Gary Audin, President, Delphi Inc.

This perennially popular tutorial provides exactly the right mix of concept, technology, and application for the beginner to get a good foundation in data communications. The course notes are excellent reference material and the instructor is one of the most highly regarded professionals in the industry.
Level: Introductory.

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Leader: James Morgan, Principal, J.H. Morgan Consultants

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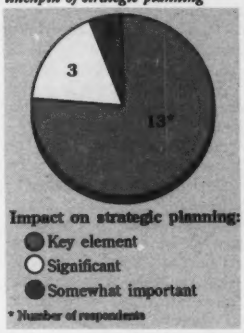
and those with business or liberal arts backgrounds. The vast majority have risen through the applications development hierarchy, and almost all have frequently changed firms and industries in the course of their careers. There appears to be a slight positive association between company tenure and/or knowledge of the industry with credibility at the executive level.

The executives fit a fairly typical profile of senior MIS management. The results of the survey are, thus, particularly interesting because they challenge a great many popular concepts and theories about MIS executives and the role of MIS in business.

Mainframes still No. 1

Sixteen out of 17 companies surveyed say mainframes are the linchpin of strategic planning



INFORMATION PROVIDED BY A 1987 KNOWLEDGE CONSORTIUM SURVEY OF 17 U.S. CORPORATIONS
CW CHART

No single planning methodology is used by a large number of participants, and even standard methodologies are being customized and tailored to the situation. Almost all of the executives surveyed use their own eclectic blend of formal training and on-the-job experience, developed by trial-and-error methods during the years, to come up with a reliable planning method.

Probably the most positive finding of the survey is the fact that users are ready, willing and able to assume greater responsibility in the area of information management, provided MIS creates the appropriate mechanisms for them. Users will then serve on steering committees, provide better systems specifications, sponsor development projects and even adopt MIS staffs as employees in their own organizations.

Innovators, traditionalists

On the basis of comments made in the interviews, the MIS departments surveyed appear to fall into two broad categories, which I term "innovators" and "traditionalists." By innovators, I refer to companies that have made significant strides in integrating MIS and business planning by means of innovative organizational structures or planning methodology.

Traditionalist firms are those in which MIS remains relatively isolated from the business and is largely concerned with operational issues.

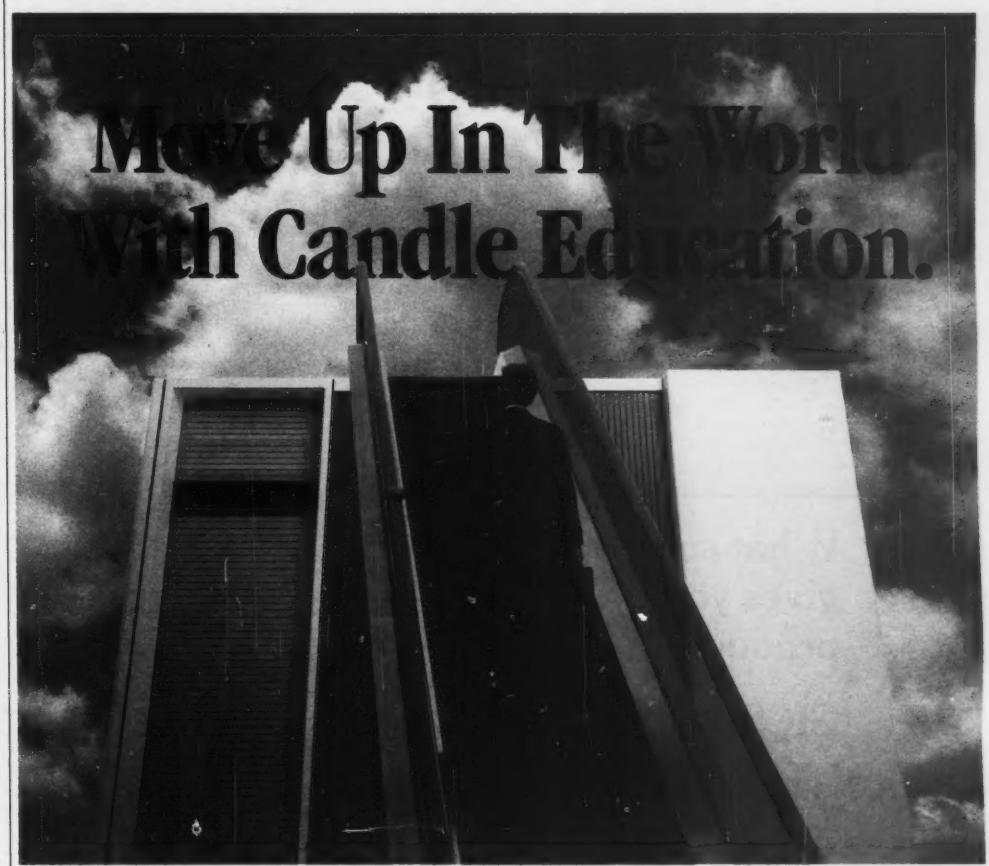
There are no value judgments attached to either label. Both sets of departments are performing their functions to their full capability and in response to their corporate environments. The study finds an almost even split between the two.

The innovators have at least experimented with new or different methodologies or organizational arrangements that help them respond to the key management challenges of increasing organizational productivity and profitability and integrating MIS with the business. Although the solutions vary, MIS innovators tend to share the following characteristics:

- Success in integrating MIS and user activities, especially by the distribution of MIS personnel resources into user areas.
- Creativity in establishing mechanisms for executive involvement in MIS decision making.
- An understanding of and appreciation for the critical success factors of the enterprise.
- An organizing principle to guide planning and management.
- Commitment to user sponsorship of MIS projects.
- A willingness to involve vendors in the planning process as soon as the strategic direction is established.

The traditionalists run MIS functions that are still largely

Continued on page 101



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MIS takes on the role of innovator

The corporations I surveyed for my research on strategic planning fell into two broad categories: innovators and traditionalists.

The following case study highlights an innovator, a company that has made significant strides in integrating MIS and business planning by means of innovative organizational structures or planning methodologies.

Corporate profile. This large savings and loan firm started as a small regional company in the 1920s. The firm achieved major status in the late 1960s because of a merger.

Currently among the ten largest savings and loan institutions in the nation, it routinely outperforms its competitors in return on assets.

The savings and loan firm currently has assets of $12.7 billion, and the firm's financial condition is "outstanding," according to the firm's interviewed MIS executive.

Run like a business, with the focus on the profit and loss statement and the margin, the company is something of a maverick in its industry.

The corporation is financially driven, with specific objectives set for a one-year budget cycle, a five-year capital growth plan and a 10-year growth program. Planning is done by each operating division, with capital expenditure requests built from the bottom up. Plans are then discussed in an annual meeting of the executive planning committee. The plans are very detailed and, so far, have been very accurate.

MIS profile. Management Information Services is centralized, with 100 MIS employees accounting for 4.9% of the total work force of 2,200.

The senior vice-president of information systems reports directly to the chairman. The departments of applications development, operations, communications (voice and data) and administration — which includes quality assurance, technical services, documentation and finance — all report to the senior vice-president of information systems.

For many years, the MIS department operated very much as a service bureau. Since 1984, however, there has been an attempt to turn this practice around and bring new people on board. Consultants were hired to suggest changes, but they could not sell management on how to implement the plan.

At that time, a new senior vice-president for MIS was brought in to report directly to the chairman of the board. This individual incorporated the firm's no-nonsense business philosophy within MIS.

The objective is to run a lean, efficient department and implement a planning methodology that allows projects to be evaluated on a business basis. MIS does not have a charter because this degree of formality would conflict with company culture. Instead, the executive has personal objectives and a mission to "take advantage of technology to maintain the firm's position in the financial community."

Planning methodology. MIS strategic planning is driven by the following three factors:

- A corporate environment that stresses the need for short- and long-term objectives against which the performance of all departments can be measured.
- The technology explosion, which requires a long-range perspective.
- The personal experience and background of the MIS executive.

MIS planning uses the same time frames as the corporation. Prior to the budgeting process, the MIS executive has a planning meeting with each user department. They discuss progress on the current year's MIS implementation plan and projects for the coming year.

The planning effort is supervised by a planning coordinator who reports to the MIS executive. Both use a customized, proprietary mathematical computer model to analyze every major planning decision.

The key benefit of strategic MIS planning is being able to assess each new product or service based on its impact on planned capacity, service levels and financial objectives. To that end, each major project, such as automated teller machines, is put into the model to calculate its impact on system capacity and financial objectives.

"Without a strategic plan for MIS, you can't gauge the effect of projects on business objectives," the MIS executive asserts. "You just can't make sound business judgments."

This plan is then presented to the executive planning committee. The committee also receives quarterly updates that compare the plan with actual figures. Moreover, an operational analysis group monitors the effect of the business plan on operations.

In addition to users and executives, vendor involvement in MIS planning is fairly substantial. Once MIS plans have been created, the major hardware and telecommunications vendors are called in to discuss new products and services.

Occasionally, vendor consultants are used for supplementary planning and to ensure MIS's direction is in keeping with market concerns. MIS, like the firm itself, does not intend to be on the leading edge. Rather, MIS waits to see that an idea works, adopts it and then improves on it.

This practice is reflected in MIS's strategies. For example, there is no data base architecture, primarily because the business's focus is on marketing and selling traditional savings instruments. Several data bases do exist, but the prevailing philosophy is that hardware will evolve in the direction of data base machines. Therefore, the thrust is toward development of standard applications.

To assist in this, the department uses a commercial life cycle development methodology. This includes a project control process to measure the results of the life cycle against the schedule.

Evaluation. Of all the firms surveyed, this savings and loan has the most formal and quantitative methodology for strategic planning.

The dynamic executive is considered a full-fledged member of the executive team, and a real attempt is made to integrate users' business plans with MIS plans. The executive only wishes he had additional planning specialists to allow him to do an even more thorough job of strategic planning.

This corporate culture emphasizes teamwork and fiscal accountability. This stance not only makes it easier to obtain information but also demonstrates the logic for planning.

One other key element for success appears to be the separation of the planning and budgetary cycles, which allows MIS to obtain planning data far enough in advance to prepare its own financial estimates.

Not all firms have as tightly knit and purposeful an organization that can allow such rigorous planning. However, this firm serves as an example of what possibilities exist for strategic planning for MIS resources.

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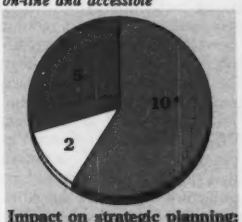
Planning

FROM PAGE 99

isolated from the business, especially from the business planning process. Computing resources as well as MIS personnel are centralized. MIS (and the MIS executive) have relatively low credibility in the firm, and information is not regarded as a resource. The MIS executive spends most of his time with technical issues or in operational fire fighting.

Appetite for DASD

Direct-access storage devices rated crucial to keeping information on-line and accessible



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The study confirms the old adage that MIS cannot do strategic planning unless the business itself does strategic planning. Very often, MIS executives have to wait for personnel changes in the management suite before the corporation is willing to take a longer term perspective on business operations. However, even without top management's leadership, MIS can do a fairly decent job of tactical planning if it can implement some of the following key organizational building blocks:

- Establishment of a formal mechanism, such as a steering committee, to involve user management in MIS planning and serve as a channel of communication.
- Implementation of a user ownership policy for MIS projects, supported by a rigorous system-development methodology that provides strong incentives for accurate requirements specifications.
- Creation of an active program to educate MIS managers and staff about the business.
- Building political alliances with key user executives.

Strategy puzzle pieces

In this section, respondents were asked the extent to which the following technologies or strategies figure in their MIS plans.

- The key planning concerns of MIS executives revolve around centralized hardware and software resources, followed closely by the network.
- Whereas end-user computing and information centers have become an accepted reality, office automation is not viewed as a strategic issue.
- MIS executives are interested in new technologies such as expert systems and integrated voice/data networks. However, they are also concerned about their cost justification.
- It is unlikely that MIS executives will use technology, such as telecommuting, videoconferencing, laptop computing or executive computing, to change the ways people work.

Most of the firms in the survey are strong on operational controls, such as security and disaster planning, and the majority have already implemented some form of office automation and end-user computing facility.

Some information technologies or strategies — such as telecommuting, executive use of computers, video- and teleconferencing — are being soundly rejected by the majority of respondents. Of interest is the fact that rejection comes not on technical grounds but because such efforts would conflict with the corporate culture.

Thus, most of the firms intend to maintain a traditional, central-site, mainframe focus while selectively implementing those technologies and strategies that generate strong economic value or user support. There is virtually no interest in technology for technology's sake, which, again, runs counter

Continued on page 103

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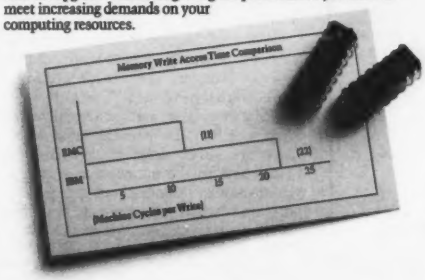

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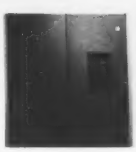

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When MIS keeps to its own business

The following case studies highlight the planning habits of two traditionalist firms — companies in which MIS remains relatively isolated from the business and is largely concerned with operational issues.

Corporate profile. Founded almost 40 years ago, this company is one of the largest general leasing firms in the country. With annual revenue of $380 million, it is in good financial condition and is expanding its operations, although the new tax laws may have an adverse effect on its strategy.

The company is structured into five independent firms, each of which handles different aspects of the leasing market, ranging from trucks, cars and airplanes to office and testing equipment. The headquarters' functions include finance, law, public relations, mergers and acquisitions and information systems.

The key factor driving the firm's success is its ability to manage money effectively, since it must borrow huge sums to fund its capital acquisitions. Strategic planning, in the sense of determining an overall direction for the businesses, defining market niches, establishing penetration levels and identifying tools and techniques to leverage these objectives, is not done. Instead, each profit center creates its own three-year plan that focuses primarily on financial targets. These plans are discussed informally within the senior executive group and subsequently distributed to the appropriate managers.

MIS profile. Information services is run by a vice-president, who reports to the chief financial officer, who, in turn, reports to the president. The corporate group has 35 employees out of a total headquarters staff of 600. Each profit center has its own MIS manager, with a dotted-line relationship to the corporate vice-president. Out of an employee population of 1,200, there are 90 additional MIS employees in the operating units.

MIS views itself as a service organization to the corporation but has no formal charter. The profit centers are very independent in their implementation of technology, and there is no overall strategic direction for information systems. Development is handled at each profit center; the corporate data center operates the hardware and the network. Consequently, its key focus is the preparation of a capacity plan.

Planning methodology. Corporate MIS and the regional MIS managers do their planning simultaneously. The three-year business plans yield one-year budgets; the MIS groups then derive their own budgets. The corporate data center has no access to details such as new locations, new businesses and acquisitions that support the plans. Instead, the controller generates reports on historical usage trends that are then forwarded to the MIS managers at the profit center.

"The business recognizes the value of information systems, but, in general, MIS does not recognize the business process. We're too busy running our day-to-day businesses," the MIS executive says.

Planning has little visibility within the corporation or MIS. At a monthly meeting, regional MIS managers discuss such factors as the directions of hardware and software, division of responsibilities and other tactical concerns. However, these discussions are basically reactive, not strategic. There is no overall plan on where to invest MIS dollars. Furthermore, executive and user involvement in MIS planning is virtually nonexistent.

Evaluation. The MIS executive in this situation must overcome fundamental cultural (and probably ego) barriers to do any kind of planning. He sees great potential for the effect of information systems on the bottom line, including electronic interfaces with vendors and customers.

However, it has been difficult to communicate this potential to the profit center executives. The current thrust is to demonstrate MIS's value by implementing small systems at a small cost. However, this approach needs to be supplemented with a conscientious, if informal, program for educating the business executives on strategic possibilities.

In the meantime, the immediate issue is to come up with a better method of estimating system capacity.

One approach would be to run close to the capacity line but apply some kind of financial penalties, such as one-time budget surcharges if the machines have to be upgraded quickly because of inaccurate forecasts.

■

Corporate profile. The second financial holding corporation subsidiary has been in business for almost 100 years and currently holds more than $5 million in assets. The corporation has always posted a healthy profit margin and has grown substantially in the last three years. It has aggressively increased its loan portfolio and continues on a high-growth curve.

Planning is exclusively tactical and reactive in nature, with time frames of one year or less. For the last 20 years, planning has been done by the president and a core committee of three senior executives. The full executive committee of seven approves the plan, which consists largely of financial objectives to be met in key areas of operation.

MIS profile. Information services is viewed as a support organization, headed by a vice-president who is three levels removed from the president. There are only 32 MIS employees out of a total work force of 1,500. Despite the small size, there are seven different departments that report to the information services vice-president — operational group support, applications programming, systems programming, systems analysis, data communications, data entry and word processing.

Growth and change in the MIS area have been explosive in the last three years. It started out with one minicomputer and 24 terminals that handled fewer than 40,000 transactions per month and grew to a hardware environment that includes a large mainframe, two minicomputers, more than 100 PCs and supermicros, 400 on-line terminals and local- and wide-area networks. More than 600 programs have been developed in that time.

The MIS executive managed this transition according to a detailed plan presented to senior management. It outlined the goals and objectives of the function and defined the critical success factors. It included a critical path analysis of the projects, appropriately grouped and prioritized. These priorities were based on the potential financial return of the corporation, especially in the area of income generation.

Planning methodology. The initial plan was highly successful in getting things moving. However, MIS is greatly handicapped in its ability to plan strategically. The highly vertical and compartmentalized structure of the holding company does not allow staff to be moved. Thus, MIS remains a separate and distinct organization. Moreover, it is viewed as strictly a service organization with no budget of its own — even the computer equipment is owned by a subsidiary within the corporation. By contrast, user involvement in the applications planning process is quite high.

All applications were designed using the KISS ("keep it simple, stupid") method, with an emphasis on creating systems that people can really use. Everything was designed in modules with a critical path identified. Periodic meetings among the MIS managers examine resource requirements, work schedules and, if necessary, project reorientation.

These managers also help the executive develop a three-year, high-level technology plan, based largely on an analysis of the trade press, consultations with peers and vendor presentations.

Although vendors are viewed as good sources of information, they are not directly involved in the planning process.

Evaluation. The information systems vice-president makes an effort to look at things as his peer executives do — primarily from a financial perspective.

However, there is no mechanism for actively soliciting input from executives on information systems and technology. What input there is is informal and sporadic. Thus, the decision is made first, and the planning follows — the classic definition of "reactive mode."

With such a small staff and a large span of control, the executive becomes involved in almost all operational issues. The executive expressed a desire for a steering committee to set priorities and back up these priorities with resources.

The larger problem with which MIS must contend is the fact that the corporation has not yet recognized the value of information and information systems in its own growth and profitability. Every effort should be made to enlist user managers in helping to quantify this relationship, and this information should be routinely shared with senior management.

Handled with sufficient finesse to keep the analysis from appearing self-serving, such public relations should help bring MIS in from the cold.

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Planning

FROM PAGE 101

to the popular image of the MIS professional.

Central-site mainframes. The respondents are overwhelmingly concerned about the need to select appropriate central-site mainframes. Sixteen out of 17 surveyed say they feel it is either the key element or that it plays a significant role in their strategic plans.

The single exception is one respondent who says the mainframe issue had been satisfactorily resolved and that software is a more pressing issue. Almost all companies say they feel the sheer impact mainframe processing has on the user community makes it a critical issue.

Others speak of the economies of scale associated with centralized processing as well as the ability to regulate, control and standardize service to end users.

Departmental minicomputers. Only five of the respondents say that using departmental minis is either significant or key to their business success, and 12 rate it as having only some or no importance.

Given the heavy mainframe orientation of the firms surveyed, this result was expected. One respondent says PCs will grow to take the place of minicomputers; another says the same functionality can be achieved via software views on the mainframe.

However, most respondents recognize the need to make exceptions to a centralized architecture. Process control, loan processing and automated teller machine processing are some of the applications being handled on minicomputers. Advocates of minicomputers feel they make better economic sense than personal computers or allow a better distribution of information in the firm.

DASD. Again, given the centralized orientation of the firms that responded, the concern for direct-access storage devices (DASD) parallels that for mainframes. Twelve respondents feel DASD is either a key element or plays a significant role in their business strategy.

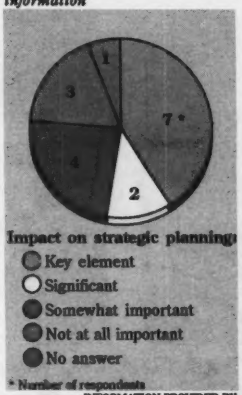
All respondents agree with one executive's view of the "unending appetite for data" and note the growing pressure from users to keep massive amounts of information on-line and accessible. Another respondent says he sees DASD as the "key building block to the movement of data."

PCs. Thirteen of 17 respondents say PCs play an important or critical role as an information delivery mechanism. Several financial institutions have woven PCs into their basic operations; most participants say they provide essential information to the business. Some respondents also note that the key MIS planning issue is not whether PCs are useful but rather how to network them together and/or integrate them into an overall information architecture.

Only one respondent negates the use of PCs as a processing mode, maintaining that all information would always be accessed through the mainframe. The three organizations that place only a small degree of importance on PCs in strategic planning feel the focus has really

Information centers: A mixed bag

Nine firms have made a major commitment; eight others blame information center users for generating superfluous information



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shifted to PC software or that justification and planning for PCs has moved into the user areas and is no longer an MIS issue.

End-user computing and the information center. Most of the survey respondents identify these two subjects so closely that they are treated as one and the same.

Nine firms say they are making a major commitment to end-user computing, having installed inquiry facilities or provided PC software to assist in reporting and analysis. They view end-user computing as an opportunity to make users self-sufficient in their reporting or to ensure that MIS stays fully cognizant of the business's needs.

Two of these respondents view the information center in particular as a mechanism to bring about cultural change what one calls "peer bonding."

The eight firms that do not see end-user computing in their plans cite lack of middle- and senior-management awareness of its benefits or concern that users will generate trivial or superfluous information.

Security and disaster recovery. Although these may be viewed as distinct areas, all but one respondent treat the two issues as a single subject. Twelve of the firms are well-along in this area, with at least one having a hot site as backup. Another firm notes that its users are active participants in the annual update defining critical data.

For the participants, the motivation to establish security and disaster recovery came from many sources: In one case, it was required by the auditors; in another, the MIS executive took personal initiative for the program. In yet another, a disaster precipitated management's attention.

In creating such a program, respondents stress the need to take a corporate viewpoint to allow the various operating units to respond consistently in the event of an emergency.

The four firms that had not addressed this issue cite lack of management awareness, a corporate culture that did not value such planning or difficulties in financially justifying the effort.

Office automation. Interestingly, respondents had the most difficult time defining office automation, stating that, frankly, they did not know what it encompassed. Most view it as providing word processing and electronic mail on the PC or mainframe.

In that context, 11 respondents say they feel it is either a key element or plays a significant role. They see an office automation strategy as being beneficial in standardizing data and reports throughout the company. One respondent says he sees it as a value-added resource and productivity aid.

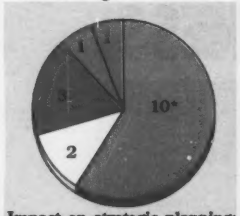
Still, most respondents report they cannot see office automation as a strategy by itself but rather as part of an overall automation strategy.

DBMS. Of the 17 respondents, 12 firms rank using data base management systems highly, saying it is key or significant to their company strategy.

Most respondents say they use mainframe DBMS as their key information facility, but many express the need to improve on traditional systems and implement fully relational systems. At least one participant

Security and disaster recovery gain attention

Most surveyed have security and disaster recovery plans in place; the four that do not cite corporate culture or budgets as obstacles



Impact on strategic planning:

- Key element
- Significant
- Somewhat important
- Not at all important
- No answer

* Number of respondents

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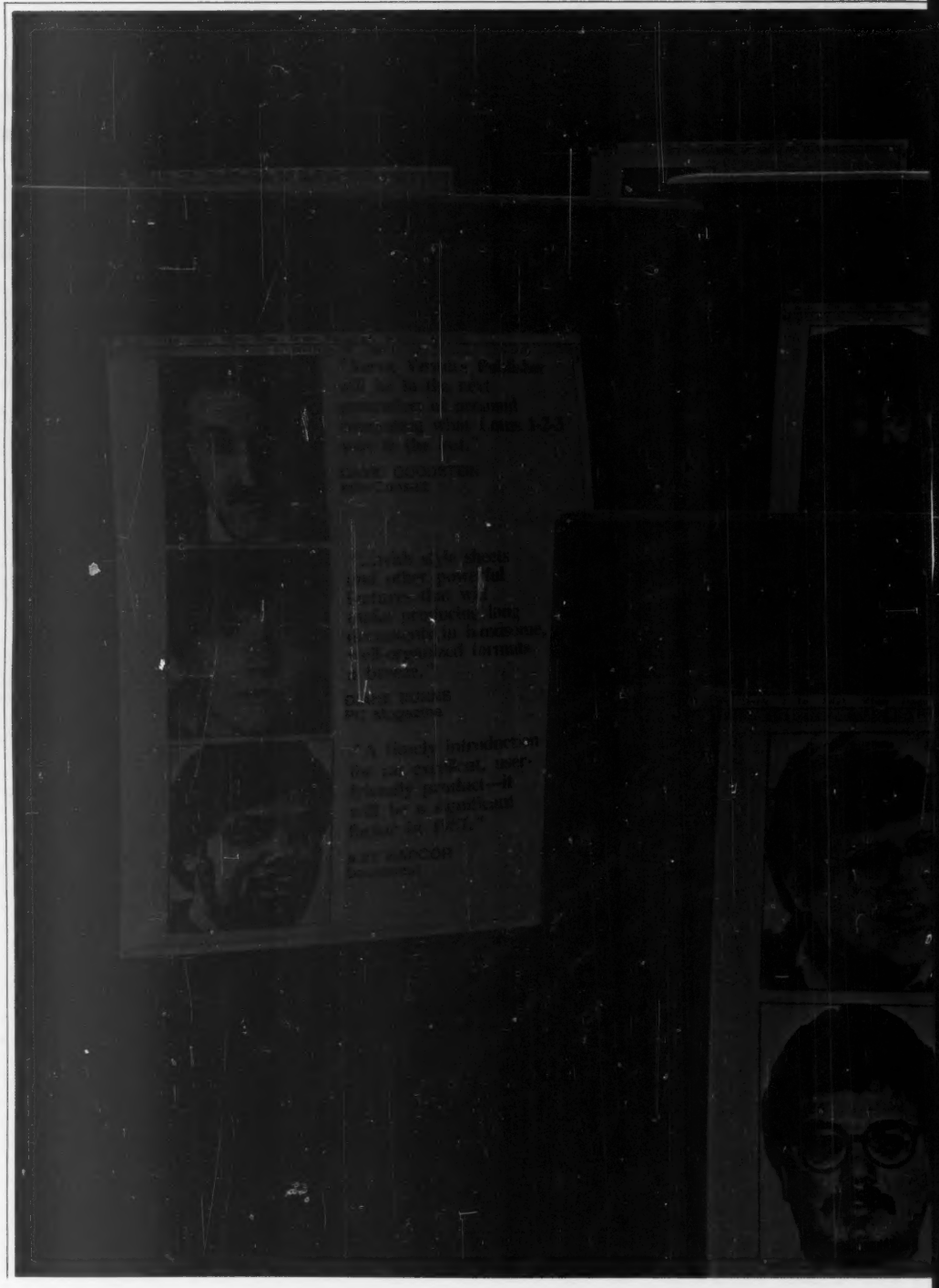


says he intends to rewrite the firm's traditional DBMS; another wants to take greater advantage of fourth-generation tools. There is also a distinct need to find a DBMS that can perform well, especially in multivendor or multihardware environments.

Many organizations say they want to provide management with more integrated information from the corporate data bases.

CAD/CAM. Computer-aided design and manufacturing (CAD/CAM) is key or significant to only two of 17 respondents.

By and large, CAD/CAM applies only to the manufacturing firms in the study, although one retailer uses it for store planning and construction. Even manufacturers show little interest in the technology. For those firms that do use CAD/CAM, it is handled either by the engineering department or it is not integrated in the MIS architecture.

LANs. No one surveyed views local-area networks as a critical issue; they either have them or they don't. The 10 firms that do not have one feel the technology is insufficiently developed or that the benefits are still debatable. Another feels it is more important to find ways of connecting intelligent PCs with the mainframe.

Even the six firms that include LANs in their plans see them primarily as filling specific niches, on the shop floor, for instance, or strictly in support of office automation. Two firms note that their new buildings have been wired for LANs and that they will take advantage of the technology, although, once again, it is not a particularly pressing issue.

Not all bad news

Five months have elapsed since the interviews were conducted. Of the 17 companies in our survey, one was bought out by another firm, and two were subjects of hostile takeovers and had to sell off assets to fight the bids.

Not all the news is bad, however. Another organization was the victom of a strike by its unionized workers, and many MIS staff members were assigned temporary duty in the user work areas. Most of the MIS managers view this as a positive experience, allowing the staff to gain a greater sensitivity to users' needs and the pressures they face.

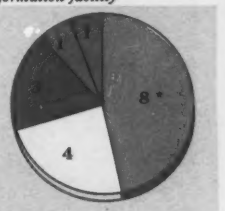
What these events really demonstrate is that business executives face enormous pressures to survive the 1980s and that all plans must be flexible enough to respond to distinct swings in economic fortunes. The best survival strategy is to take the long view, consider the largest number of possible business scenarios and join the rest of the executive team in quickly responding to change.

Often we are too overwhelmed by the steady pace of change as well as the volatile nature of information needs to spend energy in planning. But an organizing principle and a business-based planning methodology allow us to respond to changes. The better we know the business, the better MIS will be able to contribute to corporate welfare.

Now is the time for MIS executives to consider the example set by the innovators and create a means of integrating their decision making and operations with the user departments. •

DBMS gets limited mandate

Twelve firms rank DBMS high in their plans, although they want improvements on their key information facility



Impact on strategic planning:

- Key element
- Significant
- Somewhat important
- Not at all important
- No answer

* Number of respondents

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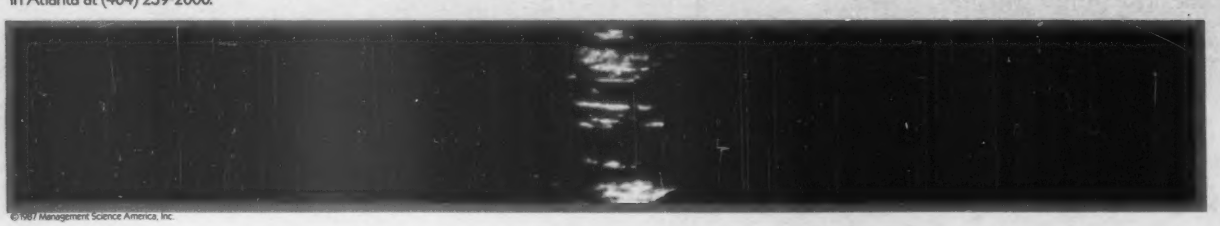

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TAKING CHARGE

David Ludlum

MIS needs leadership

What do MIS organizations and the Constitutional Convention in Philadelphia 200 years ago have in common? Both represent fertile fields for demonstrating and reaping the rewards of leadership.

MIS professionals aiming for a management role and managers seeking to climb the executive ladder know it's important for them to temper their technical knowledge with business acumen.

But effective management calls for knowledge well beyond understanding how a particular business works. It calls for leadership — the ability to inspire others to share one's goals.

Supervisors who rise above mere management to leadership are the ones who can recognize their subordinates' needs and interests and attune those to their own goals.

The results of *Computerworld*'s survey of job satisfaction published last week underline the need for this sort of leadership ability within MIS organizations.

In discussing their satisfaction, or lack of it, with their jobs, the MIS professionals and managers who responded repeatedly pointed out their need to be recognized as individuals while at work.

Among 15 factors rated for their importance to job satisfac-

Continued on page 116

He keeps close to staff

Drexel's Castellano invests in relationships

BY ALAN ALPER
CW STAFF

NEW YORK — If Joseph Castellano wasn't an MIS honcho at one of the fastest growing investment banks on Wall Street, he wouldn't know what to do with himself.

"I know one thing: I'm committed to this business," says the recently appointed managing director of MIS at Drexel Burnham Lambert, Inc. "I know I wouldn't like to run a marina in Florida."

Since graduating from Rutgers University in 1965 with a liberal arts degree, Castellano has spent most of his time livi and breathing data processing.

He says he joined Drexel because of its reputation as a good place to work, the challenge of managing the DP needs of a fast-growing but maturing company and the opportunity to broaden his understanding of the data processing field, which he calls his love and lifeblood. "At 65, I'd like to still live in New York, have a winter home in a warm climate, but still be involved in data processing," he says.

Climbing the ladder

Castellano first worked as a systems programmer, then managed development projects and helped run business units for Merrill Lynch & Co. His 12 years there were rewarded with a promotion to MIS chief in 1981. His Merrill Lynch career culminated in 1984 when he assumed the presidency of Information Market Network, known as Imnet, the firm's financial information service joint venture with IBM that was disbanded earlier this year.

Castellano's modus vivendi has been to build close relationships with peers and subordinates, colleagues say. To some observers, he embodies the blend of technological prowess and business acumen required to make it as an MIS executive in the fast-paced world of Wall Street, characteristics he attributes to his years at Merrill Lynch.

"Joe is viewed on Wall Street as the MIS executive par excellence," says Jerry Higgins, a senior vice-president at Shearson Lehman Brothers, Inc. who worked for Castellano at Imnet. "People look up to him here."

The 43-year-old Castellano, tough-talking yet low-key and understated, is now marshaling his resources to manage the MIS operations of Wall Street's most profitable firm.

He has big shoes to fill. He inherited Drexel's MIS reins in August from William Tuite, who

Continued on page 112

PROFILE

Joseph Castellano

Position: *Managing director of MIS, Drexel Burnham Lambert, Inc.*

Mission: *To tighten controls, eliminate redundancies and increase productivity in DP while maintaining an entrepreneurial spirit at the fast-growing securities firm.*

TELECOM VS. MIS

MIS, telecom joust for corporate influence

BY ELISABETH HORWITT
CW STAFF

Telecommunications managers can be classified either as dodos, pelicans or eagles, according to John Walsh, managing director of New York research company Integrated Strategies Group.

"The dodos concentrate on accounting, capacity planning and fine tuning: Squeezing every megabit per second out of bandwidth. The pelicans are trying to rethink their roles, and the eagles are already looking at the competitive role to be played by networks," Walsh says.

As more and more corporations merge MIS and telecommunications operations, telecom managers' ability and readiness to redefine their jobs is determining whether they participate in the new regime as partners or as subordinates. It may even determine whether they have a job at all. While telecom managers have their success stories, many have been eclipsed as MIS has been put in charge of efforts to harness technology to business needs.

Ironically, it is Fortune 500 companies' increasing emphasis on telecommunications as a strategic tool that is threatening to do away with the autonomy of telecommunications departments. Leased lines have become lifelines between remote sites and corporate data centers as well as between businesses and customers.

Furthermore, at the same time buying decisions have become more crucial, they have also become more difficult: Divestiture has done away with the one-stop telecommunications vendor, and the promise — or threat — of Integrated Services Digital Network has left a lot of people bewildered as to what technologies and

KEVIN POPE

protocols will still be around in the next few years.

Searching for the right combination of business and technical savvy to navigate these treacherous waters, corporate management has more often than not put MIS at the helm, with telecommunications in a subordinate role. The International Communications Association, a major user organization, recently surveyed more than 640 telecommunications professionals, asking to whom their departments reported. For 69% of respondents, the answer was DP/MIS (see chart page 110).

"Telecommunications tends to take a 'Systems Analy-

Continued on page 110

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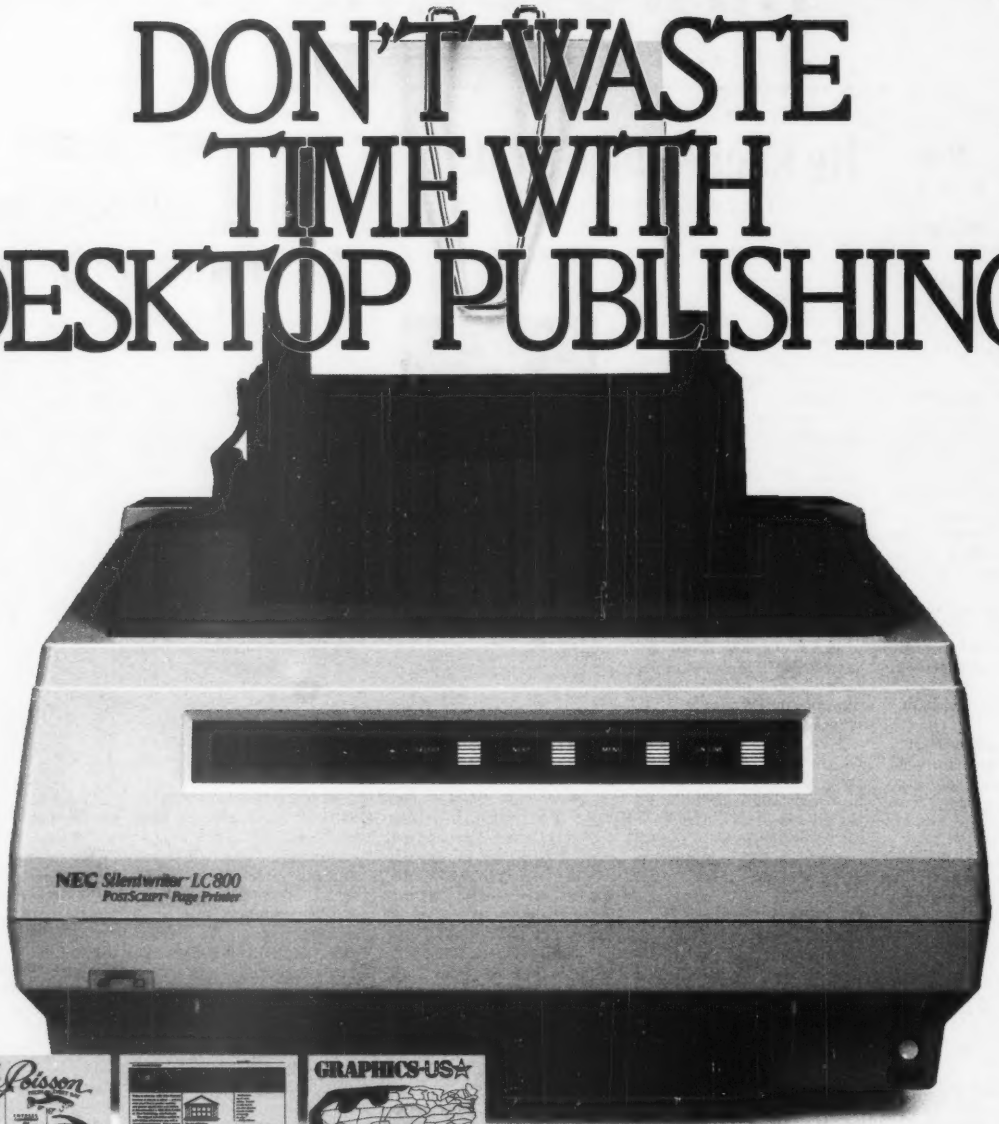

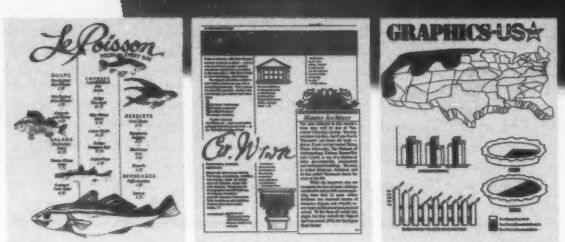

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National Retail Merchants Association 29th Annual Retail Information Systems Conference. Chicago, Sept. 27-30 — Contact: NRMA Information Systems Division, 100 W. 31 St., New York, N.Y. 10001.

Ninth Annual Lasers in Graphics/Electronic Publishing in the '80s Conference. Orlando, Fla., Sept. 27-Oct. 1 — Contact: Lasers in Graphics, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Fall '87 SAS Users Conference. Toronto, Sept. 28-29 — Contact: Alexandra Miller, C130, West Office Building, York University, 4700 Keele St., North York, Ont., Canada M3J 1P3.

1987 National Communications Forum. Chicago, Sept. 28-30 — Contact: NCF87, Suite 4808, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

Coping With Computer-Age Vulnerability. Amsterdam, Sept. 28-30 — Contact: Vulnerability Conference, P.O. Box 2039, Springfield, Va. 22152.

Defense and Government Computer-Graphics Conference. Washington, D.C., Sept. 28-Oct. 1 — Contact: National Council for Education on Information Strategies, P.O. Box N, Wayland, Mass. 01778.

Tablebase User Group Meeting. San Francisco, Sept. 28-Oct. 2 — Contact: Donna Ronayne, Data Kinetics, 97 Norman St., Ottawa, Ont., Canada K1S 3K5.

Optical Disk and Engineering Drawings in the CIM Environment: User-to-User Forum II. Chicago, Sept. 29-Oct. 1 — Contact: Randy Martin, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Federal Computer Conference. Washington, D.C., Sept. 29-Oct. 1 — Contact: Ben Hughes or Jessica Kubzansky, The Federal Computer Conference, P.O. Box N, Wayland, Mass. 01778.

Fall National Design Engineering Show & Conference. New York, Sept. 29-Oct. 1 — Contact: Show Manager, Fall National Design Engineering Show, 999 Summer St., Stamford, Conn. 06905.

Imex 87: The Integrated Manufacturing Exposition and Conference. Chicago, Sept. 29-Oct. 1 — Contact: Carol Hurley, Penton Expositions Division, Suite 900, 122 E. 42nd St., New York, N.Y. 10168.

Laseractive '87. Boston, Sept. 29-Oct. 2 — Contact: Sheila Hauser, Laseractive, P.O. Box 3415, Indialantic, Fla. 32903.

Info 87. New York, Sept. 29-Oct. 2 — Contact: Show Manger, Info 87, 999 Summer St., Stamford, Conn. 06905.

Third Annual National Joint Conference and Tutorial on Software Quality and Productivity. Los Angeles, Sept. 30-Oct. 2 — Contact: National Security Industrial Association, Suite 901, 1015 15th St. N.W., Washington, D.C. 20005.

Optical Disk: Strategic Impact on Engineering Document Management. Oakbrook Hills, Ill., Sept. 30-Oct. 1 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Fall Joint National Conference on Software Risk Management. Los Angeles, Sept. 30-Oct. 2 — Contact: Jerry Smith, QSoft, Suite 206, 2755 Hartland Road, Falls Church, Va. 22046.

Conference and Exhibition for Business and Professional Users of Apple Computers. Schaumburg, Ill., Oct. 2-4 — Contact: RJW Phase III, c/o Randall Jackson, 1511 N. Bell Ave., Chicago, Ill. 60622.

Fall Databus User's Conference. Tulsa, Okla., Oct. 2-4 — Contact: Steve Meyer, Sunbelt Computer Systems, Inc., Suite 8210, 5555 E. 71st St., Tulsa, Okla. 74136.

OCT. 4-10

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Second Annual Conference on Object-Oriented Programming Systems, Languages and Applications. Kissimmee, Fla., Oct. 4-8 — Contact: OOPSLA '87, P.O. Box 3845, Portland, Ore. 97208.

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Continued on page 114

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MIS, telecom

FROM PAGE 107

sis 101' tack, figuring out what users require from a technical standpoint, where Information Systems looks at a product in terms of business value," says Tom Davenport, director of research at Cambridge, Mass.-based Index Group, Inc., which specializes in management-related issues of technology implementation in Fortune 500 firms.

Based on his experience, Davenport is pessimistic about how easily traditional telecom staffs can become active participants in corporate strategy-setting sessions — even when they are given the chance. "So far, we are finding that even in organizations which have supposedly combined MIS and telecom departments, there is not much synergy. A national war has been transformed to a civil war with lots of finger-pointing between operating system and networking people. To have successful mergers, you need changes in personnel, not just having everyone report to one person."

This has proven the case for at least one Fortune 500 corporation, according to a vice-president there, who prefers not to be identified. "The transition to today's organization was not pleasant," recalls the executive, who says he is "on the DP side but [is] responsible for telecom."

As top management became actively involved in the concept of information delivery as a strategic resource, a management upheaval resulted, polarizing

Travelers' Waltrip

sides over the issue of whether to leave telecom autonomous or give MIS control, he explains. "They shot for too much, and the compromise we eventually reached, to merge them into MIS, brought casualties."

The ensuing conflicts resulted partly from personalities, partly from some telecom managers' refusals to change their traditional job descriptions and managerial styles, the vice-president indicates.

"Telecom managers have to face the need to become MIS managers. We had no problem with the managers higher up, but when it came to implementation, telecom managers refused to reveal their mystique." While MIS is generally service-driven, responsible for maintaining acceptable response-time levels worldwide, telecom tended to be demand-driven, concerned with responding to specific user needs, he explains.

Rebuilding

When the smoke of battle cleared, the company had lost a number of telecom managers, who felt it was "degrading" to be part of MIS, the vice-president says. The work force was rebuilt with an emphasis on "people who didn't have a strong inclination to voice or data," many of whom were data-oriented but willing to learn voice skills, he adds. The vice-president, whose background includes 15 years in data communications and DP, now oversees telecommunications and computing services.

His company appears to have paid a heavy price in personnel to attain its ideal of an integrated information services department. Some companies face another type of problem — how to further their communications strategies without being stymied by dodos who want to continue doing things the old way.

James E. Jewett, cofounder of the Nashville-based Telco Research Corp., says an airline executive recently complained to him that "telecom managers come up with tailored, complex solutions when I want fast, less complex, sometimes more expensive solutions that are less dependent on the telecommunications department. Telecommunications people are committed to the leading edge, which is less important to us than keeping in touch with users' needs."

While the traditional telecommunications manager may "come up with an exact solution to the wrong problem instead of an approximate solution to the right problem," the "value-added manager seeks line responsibility where value is created; operates telecommunications like a business; supports the company's strategic goals and makes telecommunications a competitive weapon," Jewett advises.

The industry does have its success stories, particularly among Fortune 500 companies that sensed the need to integrate telecom and DP long before divestiture of AT&T, according to Trav Waltrip, a vice-president of data processing at Travelers Insurance Co. with 35 years of telecommunications under his belt. Waltrip heads Travelers' telecommunications department, which reports, along with the DP department, to one information processing executive.

'Close relations'

"My boss can be considered to have responsibility for information technology; telecom, computer science — the glass house with the host and [direct-access storage device] — and application development," he says. Waltrip shares facilities with the five other DP vice-presidents and meets with them weekly to discuss tactics and strategy. "We have to be close relations," he says.

Far from being relegated to cabling and telephone jacks, the telecom department "is responsible for host-to-terminal connections from the host channel on," Waltrip claims. IBM communications systems such as VTAM and Network Control Program do not belong to DP, he emphasizes.

Stan Welland, manager of corporate telecom for General Electric Co., agrees that opportunities for savvy telecom managers have been opening up recently in large corporations. "I've only been here two years, but my job didn't exist before that at the corporate level. I've had to create and fill it," he says.

Six years ago, Welland was

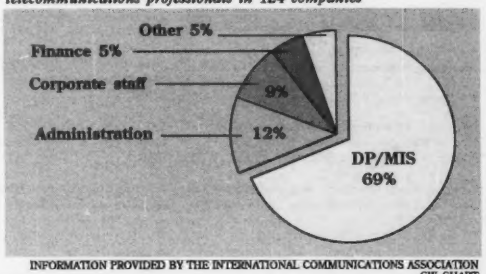
GE's Welland

manager of strategic technology at Merrill Lynch & Co. — a job that was 50% telecom, he says. He became a prime mover in the Teleport project, which involved installing a fiber-optic link between the financial service giant's New York offices and sites in New Jersey. "In 1981, the major issue was, Is fiber viable?" Welland recalls. Since then, the company has gone from keeping the link for internal use only to becoming a legitimate common carrier, reselling bandwidth to other firms as an inexpensive way to bypass the local telephone company.

Conflicts between MIS and telecom come up all the time at Welland's present job, he admits. "Today, we are distributed around the nation, and the wires that allow support of host-to-terminal connections across multiple sites have a major impact on MIS. If the lines go down, there is a lot of finger-pointing. That's why MIS and telecom have to work together: If there is a problem, the user always pays."

Telecom departments' reporting relationships

Most answer to MIS, based on a survey of more than 640 telecommunications professionals in 124 companies



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CW CHART

Lessons from universities

Corporate telecommunications managers might take a lesson from their colleagues in academia on how to work out a productive relationship of equals with MIS.

Major users of the local telephone loop, universities have become adept at bargaining with the local telephone company for price breaks and new services. Recently, many have gone private, forcing their telecommunications managers to learn how to be both their own telephone company and a business, since such services are often resold to students.

"Telecom departments have to really sit down with MIS and say, 'We don't want to take over; we're in the transport business. Whatever you put on the end of the cable is fine as long as it's compatible; we can provide the economies,' " states Mal Reader, a communication manager at the University of Calgary in Alberta, Canada.

Reader advises managers not to wait for DP to come to you and say, "Here are 300 terminals, connect them," but instead to become proactive participants in their organizations' strategic planning processes. "You need to become a funnel for plans," he says. A receptive, nonthreatening telecom manager can also become a primary contact for users who "want to talk to one person, not eight, when there's a problem."

Self-education is a prerequisite for dealing with MIS and the user community, however. "Keep up with the technology so that you can say to users, 'You're buying yesterday's news,' " Reader says. "If they tell you, 'We need a 4M bit/sec. LAN,' you can say, 'It'll cost X — do you really need it?' " Telecommunications managers also need to keep track of current equipment installations so they know what can be reused, he says.

A lot of "data people" are joining the Association of College and University Telecommunications Administrators (ACUTA), says Reader, who was the program chairman for the recent ACUTA conference in Minneapolis. "They want to learn how to provide service and support. They are used to contracting out to IBM. Now a lot of what they provide is not going through the mainframe."

Ruth Michaelecki, director of telecommunications at the University of Nebraska at Lincoln, seconds Reader's advice.

Recently, Michaelecki played a key role in getting AT&T to deliver digital 56K bit/sec. connections to the university. This was a crucial element of the university's participation in a project funded by the National Science Foundation to link researchers and computing resources in 11 Midwestern academic institutions. "The computing center director could have implemented the network, but he didn't have the time or knowledge of LATA rules," Michaelecki said.

This fall, the university will provide direct wiring between students' terminals and the university's computing facilities. Michaelecki's group has negotiated with a cable television company to provide free installation of the twisted-pair wiring that will support these services while it installs its coaxial cable.

"Those universities that have combined telecom and DP and put telecom at a low level so they report to DP have made a mistake, I think," Michaelecki says. "This is an old trend that is being reversed in areas where telecom managers have taken an agressive stance to educate themselves. When the reporting levels are equal, telecom and MIS make a good team that adds value to the university."

ELISABETH HORWITT

For excellence, author says, get closer to the customer

BY GLENN RIFKIN
CW STAFF

The MIS executive must be a maverick in order to have an impact on strategy and turn around negative perceptions of the profession. This is the prescription set forth by Nancy Austin, a Capitola, Calif.-based management consultant and coauthor with Tom Peters of the best-selling *A Passion for Excellence.*

"With the unbelievable amounts of information being generated in corporations, managers tend to be overwhelmed with priority items, and they can't act on them all," Austin says. "The MIS professional today can enlighten and facilitate action. This is the opposite of how MIS has been perceived in the past."

Austin, in Boston last week to address an executive seminar at Decworld, pointed out in an interview that one way for an MIS manager to act as a maverick is to initiate and follow through on direct customer contact, both within and outside the company.

"If the MIS executive gets out of the office and goes face to face with customers, he not only finds out what those customers need but can bring back information that has a direct impact on corporate strategy," Austin stated. "It may seem radical, but it is simply another way for management to authorize people to think."

Nancy K. Austin

Changing attitudes

According to Austin, MIS has long been perceived as an obstacle to productive action — rather than a facilitator of it. "They were a disrespected bunch who gummed up the works," she pointed out. "The only way to reverse that is to for them to get out to meet the users. Then MIS can tailor its service in a way that can't be beaten."

Austin does not believe that type of thinking is restricted to a new generation of MBA-toting MIS professionals. Longtime MIS professionals are just as well equipped to try new and radical approaches to their jobs.

"They haven't thought of themselves as leaders. In fact, when the subject comes up in seminars about bureaucracy getting in the way of productivity, MIS people identify with the frustrated masses, not with the bureaucracy," Austin declared. "They are only recently beginning to rethink how important they are to the firm."

While a first-time customer visit might be "terrifying," Austin insists that the real-life feedback is essential for MIS to prove its value to management. Of course, top-level management must show some interest in such a venture, and Austin pointed out that ironically, it is companies going through tough times that may be most receptive to this kind of thinking.

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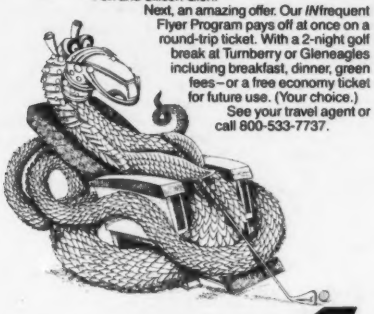

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Close to staff

FROM PAGE 107

in his 26 years became something of an institution at the $4 billion firm.

Tuite built an MIS infrastructure from scratch, grafting layer upon layer to accommodate Drexel's growth, which has almost doubled annually in the last few years — thanks in part to the prodigious corporate merger activity financed by Drexel junk bonds.

From his corner office on the 24th floor of 60 Broad St. — overlooking the East River in the hub of New York's financial district — Castellano presides over some 1,000 employees of the Information Systems Division (ISD). He oversees all DP operations, office automation and communications at Drexel's 50 offices worldwide.

The ABCs

Castellano's experience as a systems programmer and engineer has familiarized him with the basics of MIS. He began his career as a systems programmer for Public Service Electric & Gas Co. in Newark, N.J., and later joined RCA Corp. as a systems engineer when it was still in the computer business. He came to Wall Street in 1968 to develop back-office applications for Francis I. DuPont, a leading financial services firm that is now defunct.

Castellano says that early in his career he viewed each of his positions as an individual job, not a stepping stone in a career. After 10 years in the industry, however, he wanted more. "I realized that I could do more," he recalls. "I began to measure myself against what others in the industry were doing. I said, 'Let's see who's doing what; maybe I can do it.' "

He joined Merrill Lynch in 1972, running an application development unit, and entered management in 1975 as assistant to the executive vice-president of services, doing planning and budgeting. He rejoined corporate systems in 1978, heading a department that supported financial systems, then was promoted to group manager of planning for corporate systems. In 1981, he was named corporate systems division manager with responsibility for all computing operations.

In moving to Imnet, Castellano faced an uphill battle. Merrill Lynch's participation alienated its rival financial services companies, and Imnet sought to pioneer a system accessed by personal computers amid constant price erosion and technological change. While IBM and Merrill Lynch had the resources to make the venture fly, the two companies argued over strategic and technological direction, which led to Imnet's permanent grounding on New Year's Eve last year.

Not averse to risk, Castellano says he recognized the potential hazards of Imnet but felt the challenges of starting up a company were too great to ignore. "It was a very interesting experience, like a roller coaster ride," he says.

Bad news bearer

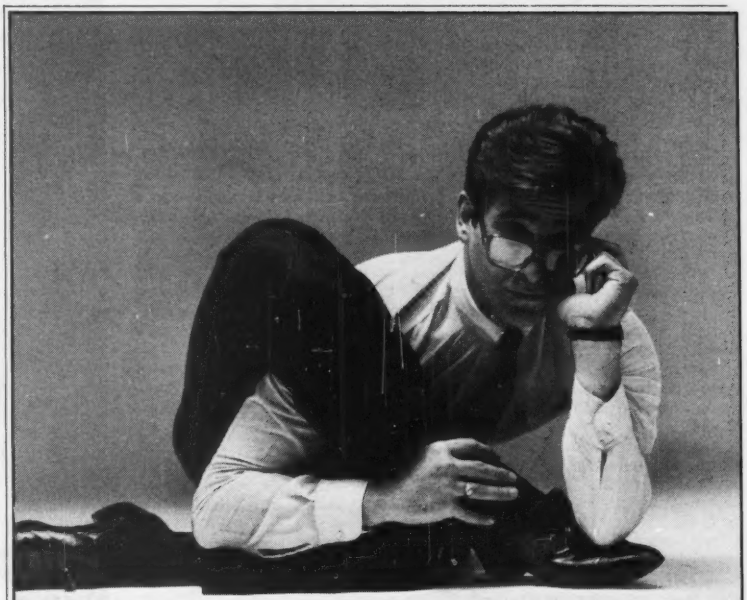
Castellano remembers last Christmas Eve, when he was told of the decision to abort Imnet. He spent a gut-wrenching week negotiating with Imnet's parents and devising a way to tell employees of their fates. On New Year's Eve he called the troops together for one last time, expecting the worst.

"He got applause and a standing ovation," recalls Shearson's Higgins. "Joe had always been exceedingly honest, and the 250 people at Imnet sensed it. He had negotiated a nice severance package and outplacement service for his people, and everyone was happy."

Castellano says he always tried to stay close to his Imnet employees, calling meetings with the entire company every six weeks to provide progess reports. Keeping his employees in-

JOHN CHIASSON/GAMMA LIAISON

Castellano *in his Manhattan office*



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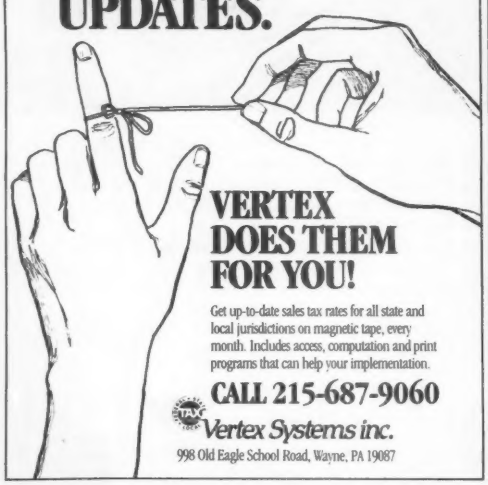

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"THE BUSINESS of running a DP organization is the process of doing a lot of little things correctly."

JOSEPH CASTELLANO
DREXEL BURNHAM
LAMBERT, INC.

formed helped build a rapport with them.

"When you build close relationships with people, you can get away with an awful lot," he says, reflecting on the response to the firm's closure.

At Drexel, ISD is doing an adequate job delivering information services to 10,000 employees, but some management pieces are missing, Castellano maintains. Drexel, a privately held, century-old firm, has traditionally operated in a freewheeling style, suitable to the frenetic pace of the investment banking business. Now, the company is adopting a more structured approach to conducting business, affecting the way it manages data processing.

"My job is to keep the entrepreneurial spirit and begin to manage data processsing as an entity that has 1,000 employees and has a large budget," he says. "My job is managing that transition from the rapid growth to a more mature environment where there will be pockets of rapid growth."

ISD employees view Castellano's arrival as the initial salvo in a campaign to manage the division by profit and loss. "In the past, the business was run as a service," says an ISD vice-president who requested anonymity. "People raised their hands for help on projects, and we hired programmers to make it happen."

Castellano views his primary challenges as eliminating redundancies and increasing productivity within the DP development staff. Drexel's traditional free-spirited approach to DP allowed a number of systems — particularly Digital Equipment Corp. VAXs and PC networks — to operate outside of MIS control. Castellano believes that critical systems functions must come under central control.

"That doesn't mean that occasionally, because business requires it, we can't loosen control and let people go out on their own," he says. "Eventually, things that run our day-to-day business have to run with regularity, and communications network and core systems that run the business should be under our control."

Making friends

Castellano says he hopes to gain influence over systems outside ISD's current sphere by making ISD more accessible to departments doing things on their own. "You get more by reaching out a hand to people and offering help than by making demands," he says. "The more you help, the more they will ask you to do."

When it comes to increasing productivity, Castellano sounds like a football coach on game day. Hard work, enthusiasm and esprit de corps will make the division more productive than any programming methodology, he claims. "There's tools and techniques, fourth-generation languages, data base managers: Yeah, we'll use that stuff, but that's not going to make the difference," he contends. "It's the people and how hard they work and what their attitude is and how well I can motivate them to do unusual things."

Castellano also believes in creating an ISD culture embodying a commitment to a quality process for developing systems, managing change and people and education.

He also expects to help improve productivity by modernizing ISD's existing computing architecture, data base structure and communications network. He likens Drexel's situation to a boomtown spreading over the horizon that has not built a proper infrastructure. "We need to get out ahead of the boom and put those facilities in place, because in the long run, those things will have a leveraging productivity effect," he says.

As the centerpiece of its modernization drive, the firm is relocating its primary data center to a new building in Weehawken, N.J., which Castellano expects to move into in April 1989.

A lot of little things

Its strategy also calls for evaluating existing technologies, such as IBM's data base mangement system, DB2, and finding ways to integrate them within the computing environment. "I always tell people that data processing is four-yards-and-a-cloud-of-dust business," Castellano says. "Once in a while you throw a long pass and someone catches it and you get lucky, but the business of running a DP organization is the process of doing a lot of little things correctly. Systems business is systematic, regular."

Castellano is getting good reviews for his willingness to listen and learn. "He's established an open door policy," the anonymous ISD vice-president says.

As he sees things now, Castellano emphasizes that, in contrast to that of retail-oriented Merrill Lynch, Drexel's architecture must suit its position as a leading institution-oriented investment banking and securities trading business.

"Drexel Burnham has a commitment to technology, but not for technology's sake," he adds. "It doesn't have a burning desire to be a technology leader. It is driven by the quality of its people and their innovativeness in coming up with new methods of investments. Technology supports it."

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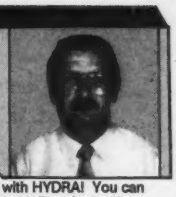

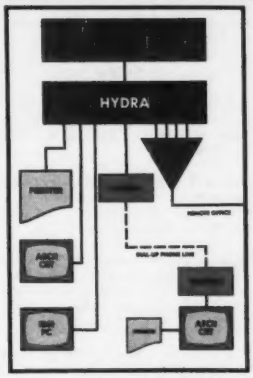

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Continued from page 109

4000 N.E. 41st St., Seattle, Wash. 98105.

Third Party Maintenance. San Francisco, Oct. 5-6 — Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Strategic Issues in Managing Information Technology. Boston, Oct. 5-7 — Contact: Decision Support Technology, Inc., Conference Registration Office, 51 Church St., Boston, Mass. 02116.

Comten Users' Exchange Fall Conference. Seattle, Oct. 5-9 — Contact: Dave Beran, CUE Coordinator, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Third Annual PDOS Interest Group Conference. Boston, Oct. 5-9 — Contact: Connie T. Roberts, Eyring Research Institute, Inc., 1455 W. 820 St. N., Provo, Utah 84601.

Feedback '87, 12th Annual DSSD User's Conference. Kansas City, Mo., Oct. 6-8 — Contact: Data Systems Structured Development, Ken Orr & Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

AVIOS '87 Conference. Alexandria, Va., Oct. 6-8 — Contact: Leon Lerman, American Voice Input/Output Society, P.O. Box 60940, Palo Alto, Calif. 94036.

Fall Meeting of the Life Insurance Systems Association. Indianapolis, Oct. 6-9 — Contact: Valerie K. Tamblyn, Life Insurance Systems Association, Indianapolis Life Insurance, P.O. Box 1230, Indianapolis, Ind. 46206.

Banyan User Group Meeting. Newport, R.I., Oct. 7-9 — Contact: Banyan Systems, Inc., 115 Flanders Road, Westboro, Mass. 01581.

Electronic Messaging '87. San Francisco, Oct. 8-9 — Contact: Electronic Mail Association, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Fourth Annual Computer Graphics Workshop. Cambridge, Mass., Oct. 8-9 — Contact: Judy DesHarnais, Usenix Conference Office, P.O. Box 385, 16951 Pacific Coast Highway, Sunset Beach, Calif. 90742.

Ami Expo. New York, Oct. 10-12 — Contact: Ami Expo Headquarters, Suite 301, 211 E. 43rd St., New York, N.Y. 10017.

OCT. 11-17

Software Publishers Association's Third Annual Conference: Exploring New Frontiers in Software. Cambridge, Mass., Oct. 11-14 — Contact: SPA, Suite 901, 1101 Connecticut Ave. N.W., Washington, D.C. 20036.

Society for Information Management's 19th Annual Conference. Seattle, Oct. 11-15 — Contact: Kathleen Niles, SIM Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Smart Card Applications and Technologies Conference. Atlantic City, Oct. 12-14 — Contact: The Information Exchange, Suite B, 15269 Mimosa, Dumfries, Va. 22026.

USE, Inc. Fall Conference (for Unisys Corp. Series 1100 users). Montreal, Oct. 12-16 — Contact: USE, Inc., Box 461, Bladensburg, Md. 20710.

Systems for Manufacturing Excellence '87. Long Beach, Calif., Oct. 12-16 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Vax Users Show, Exposition and Conference. Dallas, Oct. 13-14 — Contact: The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Scan-Tech 87. Kansas City, Mo., Oct. 13-15 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

Chem Con '87. New Orleans, Oct. 13-16 — Contact: Devon Buckler, The Synthetic Organic Chemical Manufacturers Association, Suite 300, 1330 Connecticut Ave. N.W., Washington, D.C. 20036.

System 3X Users Exposition and Conference. Atlanta, Oct. 14-15 — Contact: Systems 3X Users Show, The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

Second National Conference on Building and Operating Defect-Free Software. San Francisco, Oct. 14-16 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Fifth Biennial IEEE Careers Conference: The Engineer's Life and Career in Today's World. San Diego, Oct. 14-16 — Contact: William R. Anderson, Institute of Electrical and Electronics Engineers, Suite 608, 1111 19th St. N.W., Washington, D.C. 20036.

Solutions for Today: TOP and GOSIP Profiles. Washington, D.C., Oct. 15-16 — Contact: Technical Activities Division, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Northeast Computer Faire. Boston, Oct. 15-17 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

OCT. 18-21

Eastern Prime Users Group Conference. Philadelphia, Oct. 18-21 — Contact: Michael Muraca, c/o Eastern Prime Users Group, P.O. Box 3231, Boston, Mass. 02101.

International Data Corp. Fall Executive Conference — Systems Integration: The Business Challenge. Scottsdale, Ariz., Oct. 18-21 — Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

Fourth Annual Nomad Users Conference. New Orleans, Oct. 18-22 — Contact: Must Software International, 187 Danbury Road, Wilton, Conn. 06897.

International Tandem Users' Group 1987 Fall Conference. New Orleans, Oct. 18-22 — Contact: ITUG, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Financial Times Annual Electronic Financial Services Conference. London, Oct. 19-20 — Contact: International Business Conferences and Seminars, Minster House, Arthur St., London, England EC4R 9AX.

Hammer Forum 87 — Strategic Information Systems: The Technological Dimension. Cambridge, Mass., Oct. 19-21 — Contact: Hammer Forum 87, 5 Cambridge Center, Cambridge, Mass. 02142.

Techconnect, The Wang Compatible Trade Show. Boston, Oct. 19-21 — Contact: Sandy Hoffman, Data Base Publications, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

American Production and Inventory Control Society's 30th Annual Technical Exhibit. St. Louis, Oct. 19-22 — Contact: Stephanie Becker, APICS Technical Exhibit, P.O. Box 11480, Alexandria, Va. 22312.

CASExpo, The National Computer Aided Software Engineering Conference and Exposition. Washington, D.C., Oct. 19-22 — Contact: Hank Bowman, CASExpo, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

14th Annual Conference of the North American Data General Users Group. Las Vegas, Oct. 19-22 — Contact: NADGUG, MS C-228, 4400 Computer Drive, Westboro, Mass. 01580.

The Third Annual Expert Systems in Government Conference. Washington, D.C., Oct. 19-23 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

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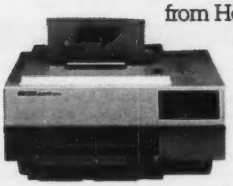

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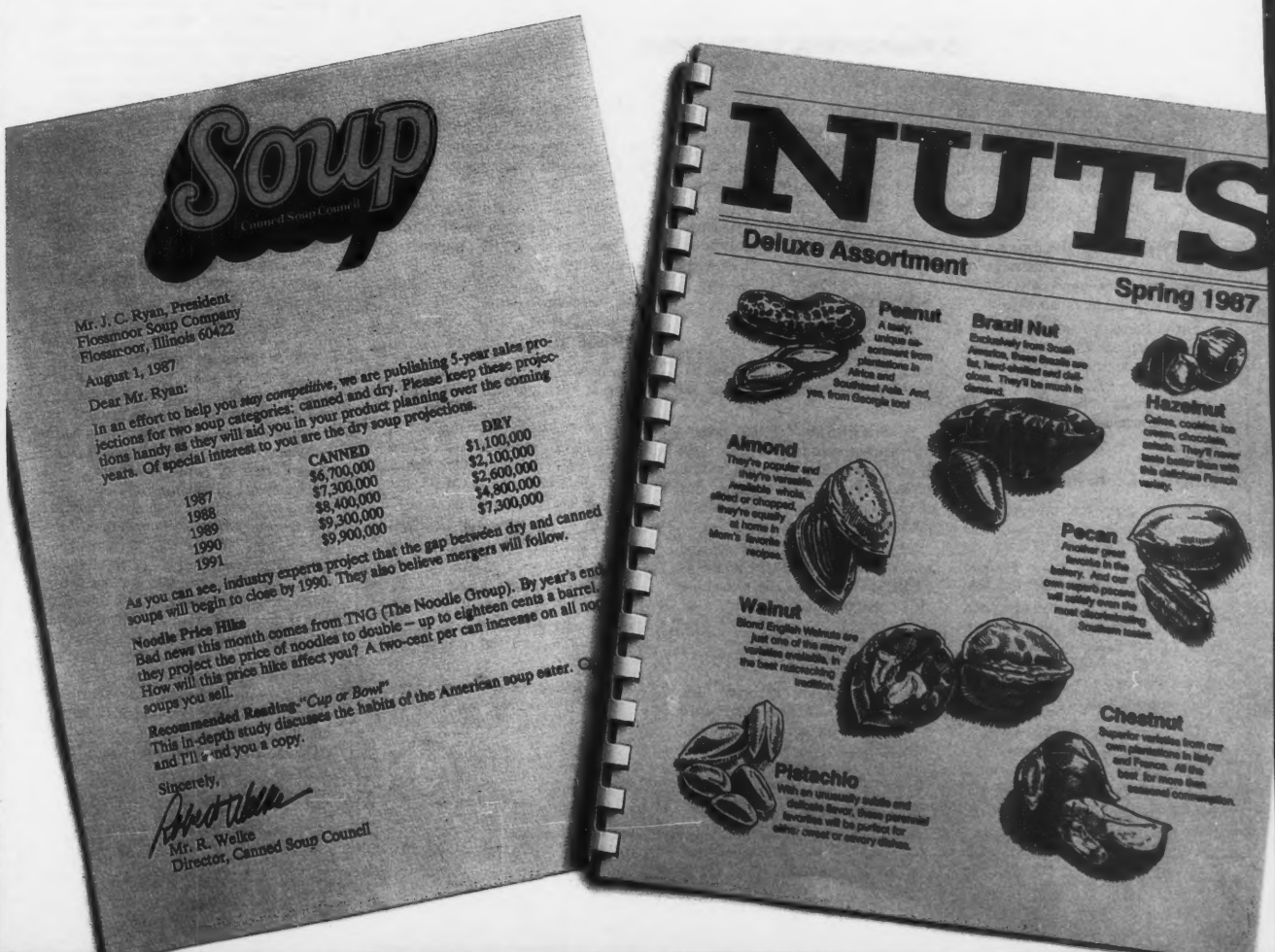
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August 1, 1987
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1990 $9,300,000 $4,800,000
1991 $9,900,000 $7,300,000
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LOCAL HAPPENINGS

NORTHEAST

Newton, Mass., Oct. 14. Society for Information Management, Boston Chapter. Monthly meeting. Newton Marriott. Contact: SIM, P.O. Box 116, Newton Lower Falls, Mass. 02162.

Boston, Oct. 16. Society for the Management of Professional Computing. Monthly meeting. Anthony's Pier 4 Restaurant. 11:30 a.m. Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

New York, Oct. 14. Data Processing Management Association (DPMA) Financial Industries Chapter. Principles of Project Management, with Thomas E. Conlon of Sherwood Securities Corp. Harry's of the American Exchange, 113 Greenwich St. 6:30 p.m. Contact: Dick Lefkon, DPMA, P.O. Box 894, Wall Street Station, New York, N.Y. 10005.

New York, Oct. 14. Association for Women in Computing, New York Chapter. Annual Fall Reception.Contact: AWC, P.O. Box 2293, Grand Central Station, New York, N.Y., 10163.

Harrisburg, Pa., Oct. 14. Association for Systems Management (ASM), Central Pennsylvania Chapter. Tour of Harrisburg DP center. City Hall. 7 p.m. Contact: Mark Anderson, 809 Acri Road, Mechanicsburg, Pa. 17055.

SOUTHEAST

Columbia, S.C., Oct. 1. ASM, Midlands Chapter. Student Night. Quality Inn, Interstate 20 and Broad River Road. 5 p.m. Contact: George F. Hayhoe, 118 Park Ave. S.E., Aiken, S.C. 29801.

Chamblee, Ga., Oct. 13. ASM, Atlanta Chapter. Robotics: Today and Tomorrow, with Les Ottinger of Advanced Manufacturing Systems, Inc. Holiday Inn Chamblee-Dunwoody, 4386 Chamblee-Dunwoody Road. Contact: Jane Roberts, HBO & Co., 1 Ravinia Drive, Atlanta, Ga. 30346.

Charlotte, N.C., Oct. 15. ASM, Queen City Chapter. Productivity in Systems Development, with Olin Broadway of Broadway & Seymour. Cosmos Steak House, 5100 E. Independence Blvd. 6 p.m. Contact: Robert Yearwood, Metro Information Services, Suite 140, 7 Parkway Plaza, Charlotte, N.C. 28217.

MIDWEST

Cleveland, Sept. 30. DPMA, Cleveland Chapter. Feagler's View of the World, with Dick Feagler. Harley House Hotel, Rockside Road and I-77. 6:30 p.m. Contact: DPMA, P.O. 6772, Cleveland, Ohio 44101.

Lafayette, Ind., Oct. 8. DPMA, Sagamore Chapter. Career Planning for a Lifetime, with Terry Phillips. Judith Painter Catering, 101 Plaza Lane. 5:30 p.m. Contact: Joan Vaughan, MIS department, Aluminum Co. of America, Box 7500, Lafayette, Ind. 47902.

Toledo, Ohio, Oct. 14. ASM, Toledo Chapter. Selling Ideas and Change to Management, with Ken J. Shoa of Executive Support Systems. Heatherdowns Country Club. 5:30 p.m. Contact: Dale R. Briggs, Computer Services, Marathon Oil Co., 539 S. Main St., Findlay, Ohio 45840.

WEST

Sacramento, Calif., Sept. 24. ASM, Sacramento Chapter. Growth of High Tech in the Sacramento Area, with Assemblyman Tim Leslie (R-Carmichael). Clarion Hotel, 16th and H Streets 6 p.m. Contact: Mike Blank, P.O. Box 15025, Sacramento, Calif. 95854.

Walnut Creek, Calif., Oct. 21. ASM, East Bay Chapter. Monthly meeting. Contact: ASM, 32 Robert Road, Orinda, Calif. 94563.

El Paso, Texas, Oct. 22. DPMA, El Paso Chapter. Disaster Recovery (Bosses Night). International Club, Mbank Tower. 5:30 p.m. Contact: Steve Tarro, Las Cruces, N.M.

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Leadership

CONTINUED FROM PAGE 107

tion, the one with the highest rating — topping concern with salary — was variety of responsibilities. The message is that MIS jocks will be particularly responsive to managers who recognize and satisfy this natural urge for variety.

Third on the list, following salary, was opportunity for advancement. Buttressing this response was the finding that only 12% of those surveyed expect to be in the same job in three years.

This concern with career advancement is one that progressive managers are increasingly recognizing and addressing through formal career development plans, such as the one recently implemented for DP workers at Pacific Bell.

Following the ubiquitous concern with work load, and rounding out the five satisfaction factors that survey respondents rated somewhere between important and very important, was nonmonetary recognition.

"A pat on the back is better than a raise for some people," one MIS director said, reflecting the yearning of many workers for explicit, personal recognition. Another respondent, a systems analyst at a hospital, said one thing he likes about his job is the knowledge that he is enhancing medical services. Workers' craving for this sense of purpose is another need that leaders can recognize and team with their own goals.

While the leadership of the founding fathers at the Constitutional Convention has been getting a lot of attention lately, MIS managers can look closer to home for examples, too. In Boston last week, one example could be found in Digital Equipment Corp.'s gargantuan Decworld.

Sensitivity to employees' needs seems to have played a significant role in the success of DEC founder Kenneth H. Olsen, to judge by the commencement address he delivered at MIT earlier this year. "I would also suggest that one of the most satisfying things is to help others to be creative, to take responsibility, to be challenged in their jobs," Olsen said.

He added that when he retires, he hopes colleagues will remember him as someone who challenged them, spurred their creativity and encouraged them to enjoy their work. MIS managers could do worse than emulating Olsen's attitude, and a lot worse than his organization has done lately.

Ludlum is *Computerworld's* senior editor, management.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

A maverick remembered

Because of the intangible nature of its products, the software and services industry has always been more volatile than most. For its customers, investors and participants, it is often difficult to get a clear picture of precisely what is happening amidst all the buzzwords. Thus, a well-informed, truly independent observer of the industry can help us all sort things out.

Nine days ago, the industry lost one of its most independent, straight-shooting observers. Tom Lawton's death at the much-too-young age of 52 deprives the industry of a unique maverick, one who liked nothing better than cutting through hype to get at the truth behind a merger, a technology trend or a major executive change.

Lawton had published the monthly "Computer Services Report" newsletter from his Belmont, Mass., home since 1981. Tracking financial performances, key industry news events and interesting rumors, the red-bordered newsletter developed a strong following among many chief executives and other software movers and shakers.

Lawton's style, both in his writing and in person, was unmistakable. He left many a CEO stammering to answer a pointed question at an ADAPSO session or irate after reading a biting Lawton quote in *Computerworld* or another trade publication. Yet I suspect those CEOs are among those who will miss him the most.

Tom was particularly cynical about the merger mania sweeping the industry in recent years. While some companies and deal makers never met an acquisition they didn't like, Tom openly questioned the wisdom of many mergers for users and investors alike. He wasn't always right, but he always reminded everyone that you need a lot more to make an acquisition truly work than a lucrative stock swap and a smiling handshake.

He spoke from personal ex-

Continued on page 118

Televideo leaves 'em at altar

Zentec latest to be stood up by picky suitor that needs a partner to grow

BY JULIE PITTA
CW STAFF

SUNNYVALE, Calif. — Looking to resuscitate its flagging sales, Televideo Systems, Inc. has spent the last two years looking for a suitable acquisition. But Televideo has been a fickle suitor, courting a number of partners only to back out before any relationship could be solidified.

After making its name in the VDT market, Televideo has recently flirted with the market for low-end systems — with mixed results at best.

It made a disastrous foray into the retail IBM Personal Computer-compatible market, tried an unsuccessful attempt to private-

K. Philip Hwang

ly label its microcomputers to OEMs and, most recently, launched an entry among Intel Corp. 80386-based Unix workstations.

"The engineering workstation is a good extension of their technology," said Michael Murphy, editor of the "California Technology Stock Letter." "But it's hard for a company the size of Televideo to maintain their current sales levels, and even add a little momentum, with a single product. It will probably be enough to keep their sales from falling any further, but they need an acquisition to grow."

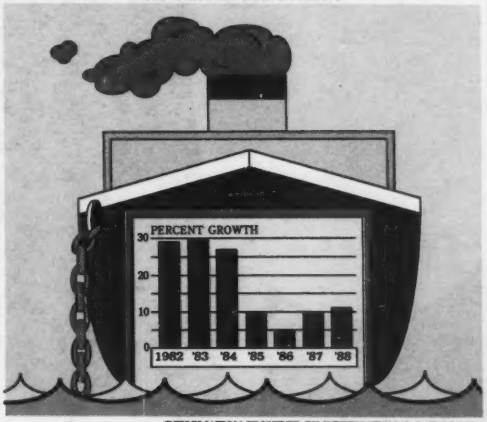
Santa Clara, Calif.-based terminal manufacturer Zentec Corp. found itself the most recent victim of Televideo's inconstant affections. After signing a letter of intent last month, Televideo and Zentec severed their negotiations, both sides saying

Continued on page 124

Data View

Industry growth on slow but steady course

Annual growth rate of worldwide computer shipment value for U.S.-based hardware vendors



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: MITCHELL J. HAYES

National Semi earns $13M

BY JAMES A. MARTIN
CW STAFF

SANTA CLARA, Calif. — Continuing its profitable rebound, National Semiconductor Corp. last week announced net income for the first quarter 1988 of $13 million, or 10 cents per share, compared with a year-earlier loss of $1.4 million, or 4 cents per share. Revenue for the quarter was $517.6 million, compared with $501.1 million for the same period last year.

The net income included a $1.5 million extraordinary tax credit from operating loss carryforwards.

Beginning with the 1988 fiscal year, National Semi adopted a 52-week fiscal year in order to

Continued on page 119

MCC tries conductor research

BY JAMES A. MARTIN
CW STAFF

AUSTIN, Texas — Microelectronics and Computer Technology Corp. (MCC) recently announced the creation of a program focusing on the development of a variety of applications using high-temperature superconductors.

The superconductor program marks the first time the MCC research consortium has opened its programs to companies that are not current members of MCC. Shareholders and outside concerns will pay $100,000 to participate; nonshareholders will pay an additional $25,000 a year.

MCC's program will focus on bolstering American industry's efforts in developing applications around the advanced technology after superconductor materials are developed. The program announcement came shortly after Japan's Ministry of International Trade and Industry said it is seeking $22 million for superconductor research next year [CW, Sept. 7].

"MCC seems to be right on schedule, but there's not a moment to lose," said Sheridan Tatsuno, a semiconductor and superconductor research analyst

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Inside

- 3Com, Novell report strong earnings. Page 118.
- Asian countries lay groundwork for establishing ISDN compatibility. Page 119.

Japanese firms team up, standardize AT clone

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Fourteen Japanese computer and software companies announced last week that they are developing a set of common specifications from which to produce IBM Personal Computer AT-compatible computers in Japan.

The effort, spearheaded by Microsoft Japan and joined by Mitsubishi Electric Corp., Sanyo Electric Co., Sharp Corp. and others, is intended to produce an AT-compatible called the AX that can run both English-language software for the AT and some specially translated Japanese software.

Final specifications will reportedly be available before the end of the year.

According to Microsoft Japan spokesman Tetsu Etoh, the manufacturers realized that if each sought to make an AT compatible independently, the result would be a group of incompatible compatibles that would not be able to chip away at Japanese market leader NEC Corp.

NEC holds a 50% share of the Japanese personal computer market and an 80% share of the business portion of that market. Its PC-9800 business computer dominates the market, boasting more than one million installations.

Laptop looms

Mitsubishi said it plans to release a laptop version of the AX early next year. Etoh said it will likely compete with the Japanese laptop that IBM Japan Ltd. unveiled earlier this week.

The AX effort follows a similar cooperation by some of the same companies several years ago to produce home computers containing common read-only memory (ROM) software but retain slightly different hardware features to distinguish each manufacturer's product.

That effort, called MSX, was also started by Microsoft but has since been taken over by its former Japanese partner, ASCII Corp. The MSX effort was not as successful as initially hoped, partly because the ROM software made the system somewhat inflexible, industry analysts said.

3Com, Novell boast strong quarters

BY STEPHEN JONES
CW STAFF

SAN FRANCISCO — Stoking enthusiasm over its imminent merger with Bridge Communications, Inc., 3Com Corp. last week reported record quarterly revenue of $33.1 million and discussed upcoming strategies for the combined company with investors here.

While analysts said the gains are impressive, 3Com was unable to get a leg up on longtime rival Novell, Inc., which also reported strong quarterly results.

Santa Clara, Calif.-based 3Com said revenue jumped 66% for the quarter ended Aug. 31 when compared with the same period a year ago. 3Com's net income was estimated at 22 cents per share, up 57% from the 14 cents reported last year.

The approximated numbers were released early so 3Com officials could discuss the company's performance with analysts and investors at a series of receptions held across the country. Complete financial results are expected this week.

Provo, Utah-based Novell saw its sales soar 87% for the third quarter ended Aug. 1, from $26 million in 1986 to $48.7 million this year.

Net income rose from $2.8 million, or 11 cents per share, to $5.3 million, or 20 cents per share.

Richard Kimball, an analyst with Montgomery Securities in San Francisco, attributed 3Com's growth to accelerated orders throughout the quarter for such products as 3+, 3Com's network operating software. He said that customers have been very receptive to new products, including a version of 3+ for the Apple Computer, Inc. Macintosh.

Bill Krause, 3Com's president and chief executive officer, noted that the revenue gap between 3Com and Novell will be narrowed once the Bridge merger is complete. "With the combined company, we'll have the largest independent networking company," Krause said.

He estimated that the two companies have a total of 10,000 customers, with 28,000 servers and 36,000 networks installed worldwide.

Under the agreement, which is pending approval from the shareholders of each company at the end of this month, Bridge will become a subsidiary of 3Com. Krause said he will focus on external issues as chief executive and chairman, while Bridge President William Carrico will be responsible for day-to-day management as president and chief operating officer.

To build on the merged company's base, Carrico said 3Com will roll out 18 major products by next May, with 10 coming from 3Com and eight from Bridge.

Carrico also discussed a plan to prevent infighting between Bridge sales personnel and 3Com dealers who might end up competing for the same customer. The policy would provide compensation to any sales representative who passes a customer lead along to the proper individual.

"Nobody wants to get cut out of sales," Carrico said. "This is something that will help the dealers and direct salespeople feel good about the merger."

A maverick

CONTINUED FROM PAGE 117

perience, having been in charge of mergers and acquisitions at Computing and Software, Inc. and Keane, Inc. in the 1970s.

And he had worked on the user side as well, with programming and systems development stints at Westinghouse, what was then Sylvania and RCA in the early 1960s.

Tom's physical presence will be especially missed at the various ADAPSO meetings, where he was a fixture for many years.

A welcome part of the scene

Whether keeping vendor executives honest at a press conference or holding court with journalists over a Budweiser in the evening, Tom had been as much a part of the ADAPSO scene as John Imlay's stand-up comedy or Bernie Goldstein's memorable speeches.

Although Tom was known for his cynical exterior, he truly enjoyed the industry and the people in it. His year-end poems in the "Computer Services Report," in which he wove executives' names cleverly into lighthearted rhyming verse, were a testament to that.

Tom and his writing will be missed by a lot of software and services people for a lot of reasons. As a journalist writing for the MIS community, I will miss his ability to size up situations in which the vendors are not always serving their users' best interests.

If there was one thing a reporter could count on from Tom Lawton, it was a truly independent opinion delivered in a refreshing, down-to-earth style. In covering the ever-changing world of software and services, that will be hard to replace.

Wilder is *Computerworld's* senior editor, computer industry.

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Asian telecom reps meet, aim to ensure compatible ISDN standards

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Telecommunications representatives from several Asian countries met here recently to plan a cooperative effort to ensure compatibility among evolving integrated services digital networks (ISDN).

ISDN is regarded by these countries as critical to their economic and technological progress. The nations included Japan, South Korea, Malaysia and Singapore as well as Thailand.

South Korea, in particular, pegs telecommunications as a key stimulant to economic growth, noted Chang Kon Kim of Korea's Ministry of Communications' Telecommunications Policy Bureau. Kim said South Korea is in the initial phase of constructing an integrated digital network, which should be evolved into an ISDN by 1992.

From 1992 to 1996, the ISDN will be rolled out as a pilot experiment in major cities. It will then be commercialized and connected to existing networks developed between now and 1991. From 1997 to 2001, the ISDN will be expanded with more services.

Japan leads the way

Japan is perhaps the farthest along in its ISDN effort, having already concluded a trial, and is set to offer all-digital ISDN services next spring via a Nippon Telegraph & Telephone network. Japanese telecommunications groups have also said they plan to propose an ISDN standard to the International Telegraph and Telephone Consultative Committee late this year.

Malaysia also wants to add ISDN features to its telecommunications network, but the project will take at least five years, according to Mohamed A. B. Yusoff, director general of Japatan Telekom Malaysia.

Lim Sze Thye, divisional manager of Information Communication Network Development at the Telecommunication Authority of Singapore, said that while Singapore Telecom will continue to digitize its existing network, the long-term view is to offer all services from a future ISDN.

Singapore already held a pre-ISDN trial test using 320,000 digital switching lines from Fujitsu Ltd.

The extent of the Asian cooperation and the possible establishment of a committee for joint ISDN study will be voted on by participating countries in early October.

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National Semi

CONTINUED FROM PAGE 117

have four equal quarters of 13 weeks. As a result, the first 1988 quarter was shorter than the same quarter a year earlier, although revenue and orders increased slightly.

National Semi's revenue and income were close to analysts' expectations. "It was a reasonably good quarter, especially since it coincided with the slower summer months," said Edward C. White Jr., a semiconductor analyst with E. F. Hutton & Co. in New York.

National Semi's performance "sets the stage for further growth down the line," White added. National Semi is expected to remain profitable, although the recent Fairchild Semiconductor Corp. acquisition will have a negative impact on its income during the next two quarters.

Fairchild agreed to be acquired by National for $122 million in stocks and warrants earlier this month [CW, Sept. 7]. The acquisition is expected to catapult National Semi into the No. 3 position in the U.S. semiconductor industry.

MCC

CONTINUED FROM PAGE 117

at Dataquest, Inc. in San Jose, Calif. "The Japanese seem to be behind us now, but that might be short-lived."

Research and development agreements are scheduled to be signed Oct. 15 between MCC and technology companies interested in joining the MCC superconductor program. MCC spokesman Bill Stotesbery said that a significant number of current MCC shareholders have expressed interest in the program, but he would not elaborate.

MCC shareholders include Advanced Micro Devices, Inc., Digital Equipment Corp., Hewlett-Packard Co., Control Data Corp. and National Semiconductor Corp.

Absent from the list is IBM, which is not an MCC shareholder and is not expected to join the program because of its own large-scale research efforts in superconductor technology.

Initial research is scheduled to begin in November.

The program is the first addition to MCC's stable of research areas, which include computer-aided design for very large-scale integration, software, semiconductor packaging and integration and advanced computer architectures.

NICKELS & DIMES

American Software, Inc. announced revenue for the first quarter ended July 31 of $11.2 million, compared with $10 million in the previous year. Profits were $1.3 million, or 12 cents per share, compared with $1.7 million, or 16 cents per share, in the like quarter a year ago.

Intelogic Trace, Inc. announced net earnings of $3.1 million, or 21 cents per share, on revenue of $32.5 million for the fourth quarter ended July 25. This compares with net income of $4.4 million, or 26 cents per share, on revenue of $36.7 million reported in the previous year.

For the year, revenue was $134.5 million, compared with $155.8 million in the previous year. Profits were $8.6 million, or 54 cents per share, compared with $20 million, or $1.10 per share, in the comparable period a year ago.

MacNeal-Schwendler Corp. reported revenue for the second quarter ended July 31 of $16.3 million, compared with $12.7 million a year ago. Profits were $4.2 million, or 34 cents per share, compared with $3.3 million, or 27 cents per share, a year ago.

Concurrent Computer Corp. announced net income for the fourth quarter ended July 31 of $3.2 million, or 28 cents per share, compared with $1.1 million, or 10 cents per share, a year ago. Revenue was $68.6 million, compared with $55.8 million reported for the same period a year ago.

Net income for the year was $7.9 million, or 69 cents per share, compared with $6.1 million, or 58 cents per share, one year ago. Revenue for the year was $247.8 million, compared with $244.8 million reported in the previous year.

The Meridian Group announced pretax earnings of $11.2 million for the year ended May 31, a 24.3% increase over 1986 performance. Net earnings were off only 22%, to $5 million, despite a reported 93% increase in the company's tax provision, due largely to the repeal of the investment tax credit. Total fiscal 1987 revenue declined to $139.8 million from $141.7 million in 1986.

Corvus Systems, Inc. announced revenue for the past year of $36.1 million, compared with $42.1 million in the previous year. A net loss of $19.8 million, or 67 cents per share, was reported for the year, compared with a net loss of $32.4 million, or $1.15 per share, a year ago.

For the fourth quarter ended May 31, Corvus reported revenue of $7.3 million, compared with $11.4 million in the like quarter a year ago. Net loss was $10.5 million, or 36 cents per share, compared with a loss of $2.7 million, or 9 cents per share, for the like period last year.

Mohawk Data Sciences Corp. announced net income for the first quarter ended July 31 of $2 million, or 12 cents per share, compared with $1.8 million, or 11 cents per share, for the same period last year. Revenue was $20.5 million, compared with $24 million in the previous year.

System Industries, Inc. announced revenue for the year ended July 26 of $119.5 million, compared with $103.3 million a year ago. Profits were $5.2 million, or $1.12 per share, compared with $4.1 million, or 91 cents per share, in the previous year.

Televideo Systems, Inc. reported revenue for the third quarter ended July 31 of $19.1 million, compared with $25 million a year ago. The company reported a net loss of $2.5 million, or 6 cents per share, compared with a net loss of $689,000, or 2 cents per share, in the previous year.

Teknowledge, Inc. announced revenue for the year ended June 30 of $20.5 million, a 40% increase over the $14.6 million reported last year. The company reported a net loss of $2.8 million, or 39 cents per share, compared with net income of $669,000, or 13 cents per share, a year ago.

For the fourth quarter, revenue was $5 million, compared with $4.3 million a year ago. Net loss was $2.9 million, or 41 cents per share, compared with a net loss of $310,000, or 5 cents per share, in the like period a year ago.

Anacomp, Inc. announced revenue for the third quarter ended June 30 of $108.6 million, compared with $27.4 million in the previous year. Profits were $8.4 million, or 23 cents per share, compared with $404,000, or 1 cent per share, in the like period a year ago.

PDA Engineering announced revenue for the year ended June 30 of $21.7 million, compared with $17.4 million a year ago. Profits were $321,000, or 8 cents per share, compared with $1.4 million, or 36 cents per share, last year.

For the fourth quarter, revenue was $5.6 million, compared with $4.5 million a year ago. The company reported a net loss of $489,000, or 13 cents per share, compared with net income of $265,000, or 7 cents per share, reported in the previous year.

Encore Computer Corp. reported revenue for the third quarter ended July 25 of $3.6 million, a 165% increase over the

Continued on page 124

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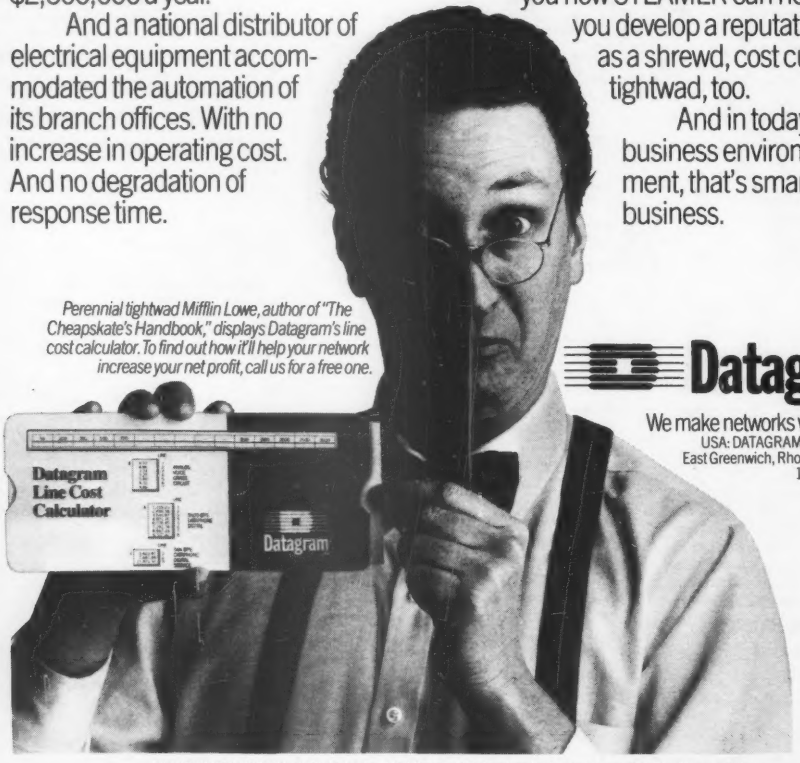

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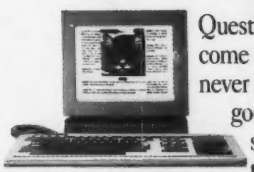

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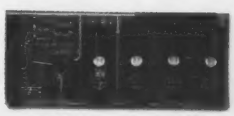

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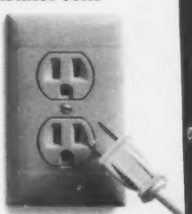

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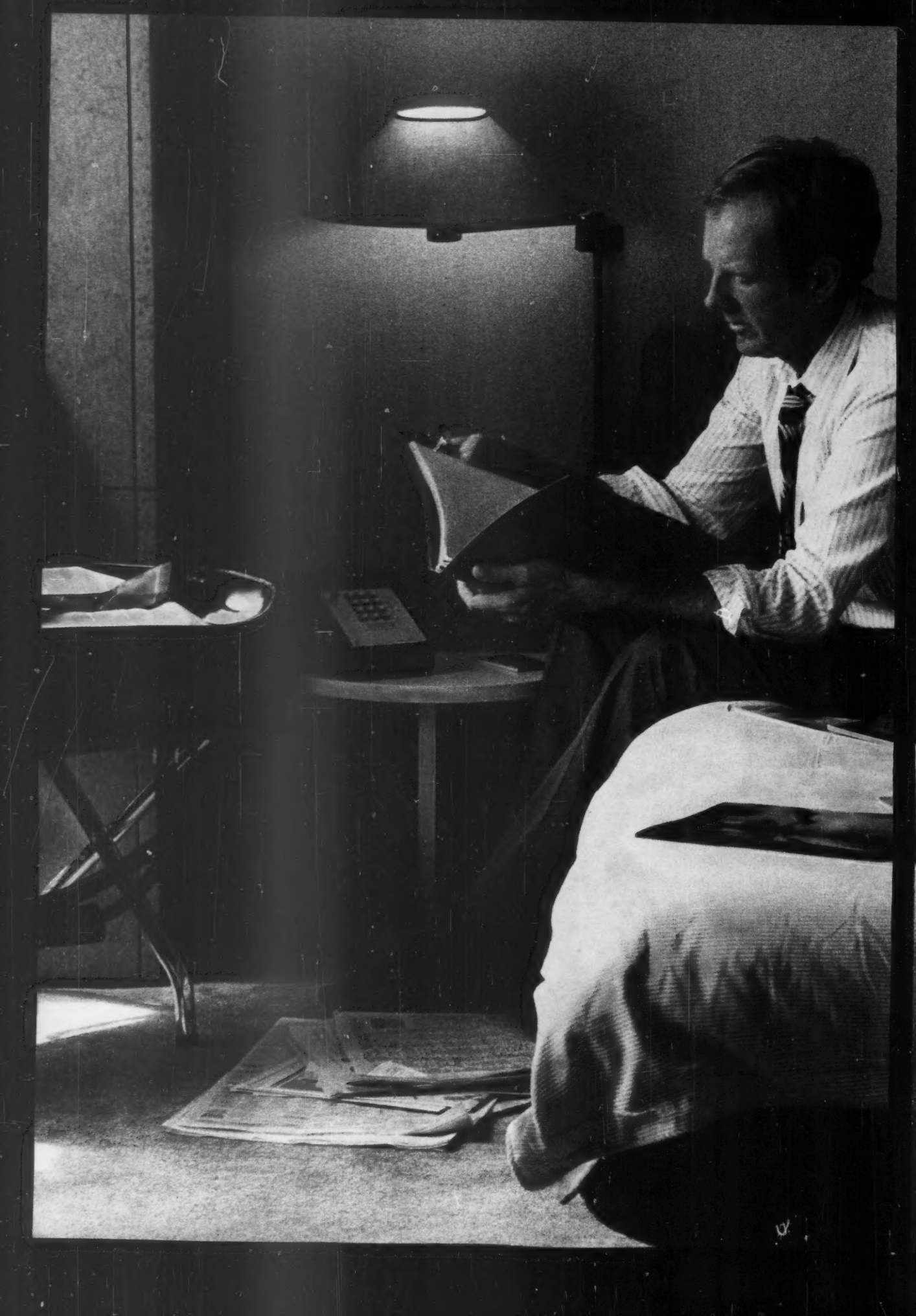

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Televideo

CONTINUED FROM PAGE 117

the marriage would not be in the best interest of their respective companies.

According to sources close to the negotiations, it was the issue of who would assume the chief executive's title — Televideo Chairman and Chief Executive Officer K. Phillip Hwang or Zentec President and CEO William D. Parker — that finally tore the prospective merger apart.

The merger with Zentec would have updated Televideo's VDT line as well as brought it a number of OEM accounts. Televideo, which sells most of its low-end systems and terminals through distributors, has been largely unsuccessful in penetrating the OEM market with either terminals or microcomputers, while two-thirds of Zentec's sales have been to OEMs.

"Zentec would have been neat if they could have pulled it off," Murphy said. "It certainly made sense from a product point of view and a distribution point of view, and it would have brought them management. Televideo needs management."

In a recent interview, Hwang attributed Televideo's inability to find a major acquisition to a lack of good candidates. Of Zentec, he said, "The idea was good, but there were some differences in management."

However, observers said that Hwang's hands-on management style has proven an obstacle to a corporate partnership and has resulted in a number of management defections. Hwang owns more than two-thirds of Televideo's common stock. "Phil Hwang needs to be persuaded to give up some control," Murphy said. "That's always been the problem."

Hwang dismissed any charges that Televideo has suffered from management departures. "Every company has management changes, but because we haven't done well for the last three or four years, people focus on them," he said.

Televideo's failed courtship of Zentec is not the first time Televideo followers have been disappointed. Last year, the firm signed a letter of intent to acquire Alpha Microsystems, Inc. in Irvine, Calif., a manufacturer of low-end systems sold primarily to value-added resellers.

Almost a month after the letter of intent was signed, Televideo pulled out of the deal. At the same time, the company's board of directors resigned and Televideo Chief Operating Officer Howard Oringer, an advocate of the acquisition, was demoted.

A corporate priority

Hwang insisted that finding a suitable acquisition is a priority for Televideo.

"There are some areas that we'd like to get into during the next year that we don't have in-house," he explained. "They would require acquisitions. But first, we need to define which businesses we want to focus on. We have terminals, but maybe we need to update our products through an acquisition. We're in the file server business, but we're not as competitive as, let's say, Novell, so maybe we need to acquire a network company."

Cash-rich Televideo — it has about $65 million in reserves — has been successful in making minor equity investments. Earlier this year, the company purchased a 51% stake in Delta Data Systems Corp., a manufacturer of Tempest-standard systems for the government market. Last year, it purchased a minority interest in Unix developer Microport Systems, Inc.

However, industry analysts agreed that those investments are not enough to revive sales. In its third quarter ended July 31, Televideo reported a $2.5 million loss on sales of $19.1 million, representing a steady decline in revenue.

"They have so much cash that they're going to be around for a long time," said Joel Hausman, industry analyst for Robertson, Colman and Stephens. "But they need to do something with that cash, and chances are it will be an acquisition that would give them different products and different distribution channels and be large enough to enable them to leverage their Far Eastern manufacturing ability."

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Nickels

CONTINUED FROM PAGE 120

$1.3 million reported for the like period last year. The company reported a net loss of $2.5 million, or 11 cents per share, compared with a net loss of $2.6 million, or 12 cents per share, in the comparable period a year ago.

Network Systems Corp. announced net income for the second quarter ended June 30 of $4.9 million, or 17 cents per share, compared with $3.8 million, or 13 cents per share, in the same period last year. Revenue was $30.6 million, compared with $26.1 million last year.

Archive Corp. reported net income of $2 million, or 18 cents per share, for the third quarter, compared with net income of $430,000, or 4 cents per share, in the like quarter last year. Revenue was $24.4 million, compared with $19.3 million for the like period last year.

Cipher Data Products, Inc. announced revenue for the fourth quarter ended June 30 of $42.2 million, compared with $50.6 million in the previous year. Profits were $1 million, or 7 cents per share, compared with $3.8 million, or 26 cents per share, in the previous year. For the year, the company reported revenue of $178.2 million.

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EXECUTIVE CORNER

Hercules Computer Technology, Inc., a manufacturer of graphics cards for the IBM Personal Computer and Personal System/2 lines, announced the appointment of **Jim Harris** as company president and chief executive officer.

Harris has served as a business consultant for Hercules since the company's inception five years ago.

Lee Data Corp. announced that **Robert D. Gordon** has joined the company as senior vice-president and chief financial officer, with overall responsibility for finance, accounting, information services and customer administration.

He succeeds **Duane S. Carlson**, who remains executive vice-president and a member of Lee Data's board of directors.

Gordon joins Lee Data from First Bank System, Inc., where he was executive vice-president and managing director for corporate banking.

Planning Research Corp. (PRC), a wholly owned subsidiary of Emhart Corp., announced that U.S. Undersecretary of Commerce **Anthony J. Calio** has been appointed senior vice-president for management and operations, effective this month.

In the newly created position, Calio will assist PRC President **Wayne Shelton** with the management of corporate functions and activities, oversight of government operations and support and coordination of the firm's government activities.

The company also announced the appointment of **Francesco A. Calabrese** as a senior vice-president of PRC and president of PRC Government Information Systems.

Scientific Computer Systems has named **Jack W. Hugus** chairman of the board in addition to his responsibilities as chief executive officer.

Hugus joined the company in October 1985 as president and chief operating officer and was named chief executive officer in March.

Applitek Corp. announced the election of **Larry H. Holswade** as president and chief executive officer. **Ashraf M. Dahod**, founder of the company, remains on Applitek's board of directors.

Holswade formerly served as vice-president and general manager of Data General Corp.'s Federal Systems Division.

Fibercom, Inc. has appointed **Richard Popp** president and chief executive officer. Before joining Fibercom, Popp was with Paradyne Corp. of Largo, Fla., for 5½ years, most recently as corporate vice-president for product development.

Summa Four, Inc. announced the appointment of **Barry R. Gorsun** to the position of executive vice-president and chief operating officer. In this newly created position, Gorsun is responsible for the day-to-day management of the firm's Business Products and Network Systems operations.

Control Data Corp. has promoted **Kenneth E. Hendrickson** to the position of vice-president of the Large Disk Division in the Data Storage Products Group. He previously served as vice-president of engineering for the same division.

Before joining CDC in March, Hendrickson was responsible for several disk drive functions at IBM, including the low-end storage independent business unit, which developed and manufactured the 5¼-in. file for IBM's Personal Computer AT, and the 8- and 14-in. manufacturing programs at IBM's Rochester, Minn., facility.

Monte D. Lien has been appointed vice-president of research and development for DSC Nestar Systems, Inc., a member of the Business Network Systems Group of DSC Communications Corp. Lien will oversee three product development groups: hardware engineering, software engineering and engineering support.

Prior to joining DSC Nestar, Lien was director of software development for AIT, Inc., a performance CPU and computer systems builder. Previously, he served as director of advanced development for Bridge Communications, Inc.

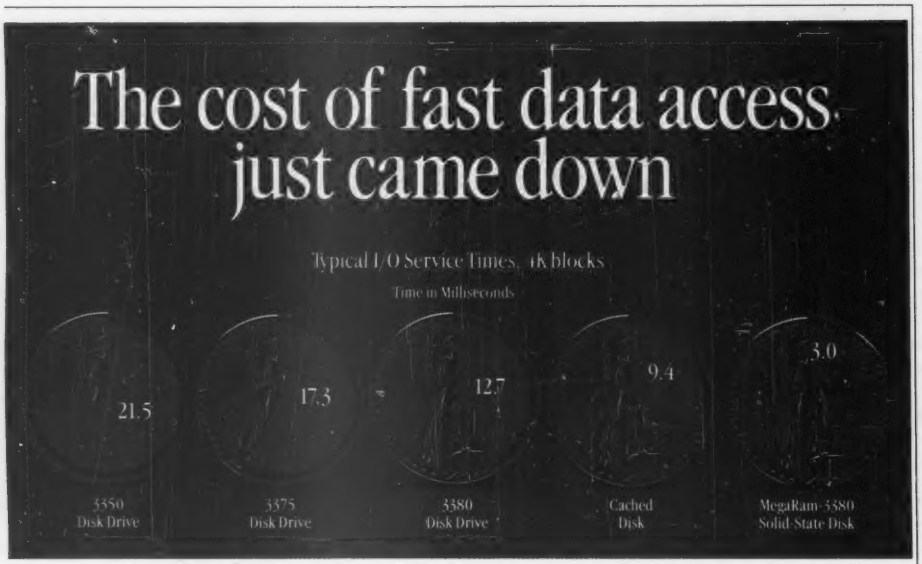
Apollo Computer, Inc. has appointed **William J. Cunningham** to the position of vice-president and general manager of manufacturing.

Cunningham joined Apollo from Honeywell Bull, Inc. in Billerica, Mass., where he was vice-president of U.S. manufacturing and product operations.

Alliant Computer Systems Corp. announced the appointment of **John M. Harte** as president of European operations. Harte most recently held the post of vice-president of worldwide sales, service and marketing at Floating Point Systems, Inc.

Ungermann-Bass, Inc. has promoted **Gary A. Wetsel**, vice-president of finance, to the post of vice-president and chief financial and administrative officer.

Wetsel replaces **Robert K. Dahl**, who resigned from his day-to-day management responsibilities at Ungermann-Bass. Dahl will continue to serve as a member of the company's board of directors.



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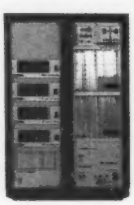

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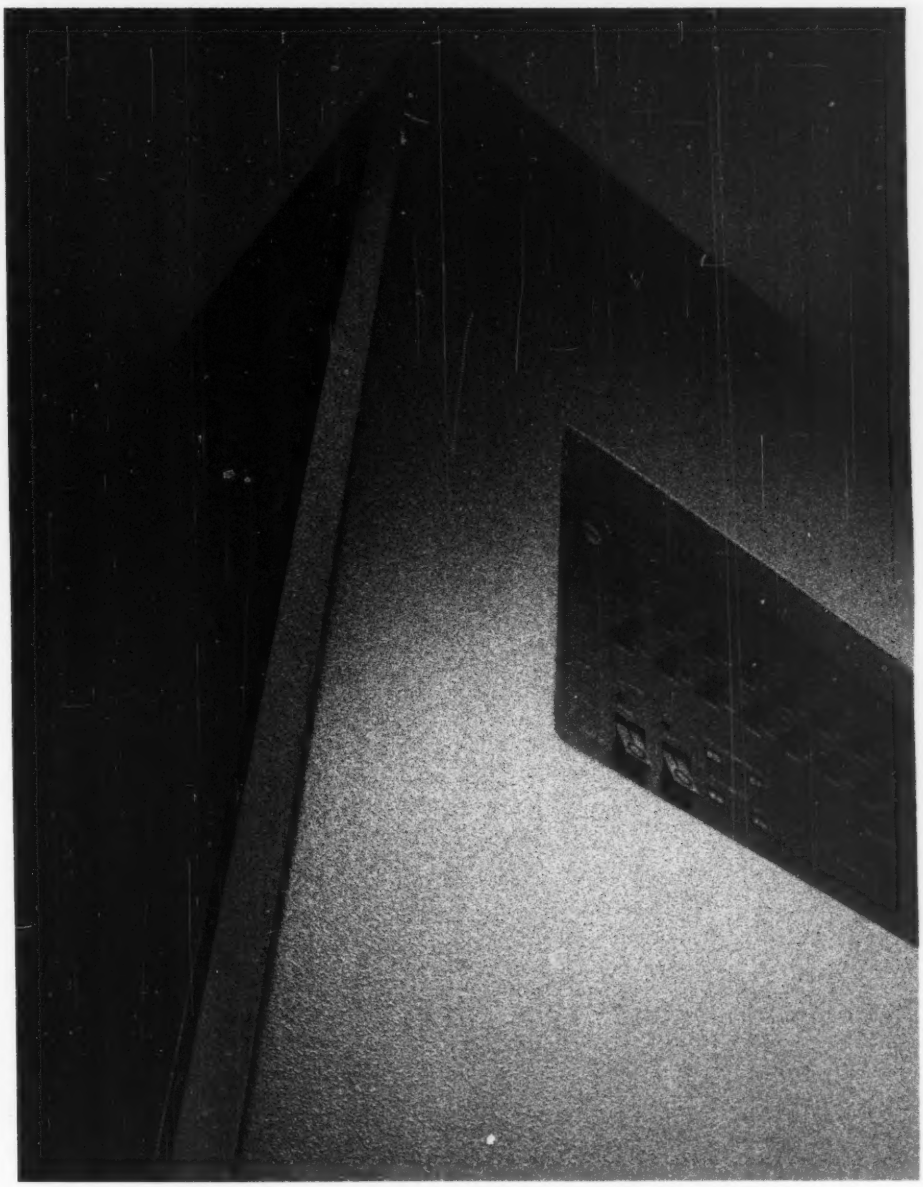

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This year, the aggressiveness of the 'big two' signaled a potentially long war for the distributed processing market.

IBM REGROUPS; DEC RIDES HIGH

BY JAMES CONNOLLY

Major developments at a glance

The year in big boxes since the last Hardware Roundup

▶ **October 1986:** Amdahl introduced 4.5M byte/sec. channel rates. IBM brought out 9370. Unisys added MCP/AS to A10 and introduced mid-range 2200/200 series.

▶ **December 1986:** Honeywell announced plans to spin off Honeywell Information Systems.

▶ **January:** DEC targeted data centers with VAX 8974 and VAX 8978. IBM replaced original 3090 with E models and added 300E and 600E. NAS announced dyadic AS/XL 70 and 6M byte/sec. channel speeds. Wang unveiled VS 7000.

▶ **February:** Amdahl answered IBM's 3090 moves with its own E versions. Cray introduced low-end X-MP/14SE. DEC reworked pricing and announced 8250, 8350 and 8530. Honeywell cut DPS 90 prices by 10%.

▶ **March:** CDC moved into departmental systems with Cyber 180 Model 930. NAS raised AS/XL memory to 2G bytes and announced AS/VL mid-range line. Unisys merged Unix families and expanded V series.

▶ **April:** ETA Systems announced ETA 10. Honeywell Bull revealed DPS 7000 as first product. Prime released high-end 6350 and 6550. Unisys added MCP/AS to A15 and A12.

▶ **May:** IBM enhanced 4381 with 20 series, overlapped 4381 with low-end 3090 120E.

▶ **June:** Honeywell Bull replaced DPS 8 with DPS 8000.

▶ **July:** Cray added Cray-2S.

▶ **August:** DEC cut low-end prices while hiking high-end prices. HP shipped first HP 3000 Model 930s.

▶ **September:** IBM announced 4.5M byte/sec. channels.

CW CHART

Decentralization. Distributed processing. Networking. These buzzwords rang familiar this year for computer industry veterans who remembered the minicomputer invasion of the 1960s and the births of Digital Equipment Corp.'s VAX and the enigmatic IBM 8100 in the 1970s.

Those concepts, particularly distributed processing, reasserted themselves this past year, perhaps more strongly and with a greater sense of permanence than before. Advocates of decentralization took to soapboxes to speak of off-loading the mainframe, peer-to-peer networking and serving the end user.

During the year since *Computerworld* published its last Hardware Roundup, DEC has built on the success that stunned the industry in 1986. The company promoted its network and the strength of its VAX architecture in a bid to edge into IBM's corporate computing stronghold, where DEC targets the smallest departments and the largest data centers.

But while DEC advanced seemingly unopposed for much of 1986, in the past year IBM has been on the offensive. The company responded to DEC's success in three ways: with the celebrated rollout of the 9370, a system IBM calls a "superminimainframe"; uncharacteristically candid promises of the System/36 and 38 successor known as Silverlake; and a string of connectivity and productivity announcements, including Systems Application Architecture and low- and high-end VM packages.

The aggressiveness of the two leading computer companies, both on the hardware and the software fronts, combined with the lurking specter of standards-oriented vendors of Unix and microprocessor-based systems, signal a war for the distributed processing market that could last for years.

"IBM is getting back into it," notes John McCarthy, research manager for Cambridge, Mass.-based Forrester Research, Inc. "It's the 9370. There's an appeal to that machine. People have been waiting for it for years. The DP guy has been saying for all that time, 'We're waiting for IBM to announce.' Well, IBM finally announced."

McCarthy says the attraction of the 9370 is not just a processor or architecture but the repackaging that goes with it. He cites the rack-mounted peripherals, tiered software pricing and the offering of VM/IS and the promise of MVS/IS for unsophisticated users.

In addition, DEC is losing steam, McCarthy maintains, in part because of overemphasis on the Decworld show that wound down last week. He claims potential DEC customers asking about product directions tired of being told for months, "Wait until Decworld." He adds that a year ago, IBM's principal weapon against DEC's low-end offerings was the System/36. Now, IBM wields 9370s and the threat of Silverlake.

But, according to another consultant, DEC — taking advantage of the ongoing confusion in

Connolly is *Computerworld*'s senior editor, systems & peripherals.

IBM regroups

FROM PREVIOUS PAGE

connection with IBM's overlapping product lines and compatibility problems — will continue at a strong pace, at least until it is hit with the challenge of maintaining the systems that have boosted its revenue.

"DEC is riding high, and I think they will keep going strong for at least a year until the [system] maintenance catches up to them," says Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

IBM fortifies position

Meanwhile, most analysts say that IBM has recognized the need to strengthen its mid-range offerings through the 9370, Silverlake and varied communications and software announcements.

> "THERE is a perception that IBM is slowing down, and IBM is concerned about that perception."
>
> OMRI SERLIN
> ITOM INTERNATIONAL CO.

The product line that IBM calls System/3X — including the System/3, 32, 34, 36 and 38 — has an installed base of more than 200,000 computers, according to analyst Omri Serlin, owner of Itom International Co. in Los Altos, Calif.

"That makes it by far the most successful mid-range computer of all time. Nonetheless, there is a perception that IBM is slowing down, and IBM is concerned about that perception," Serlin says.

IBM has responded by doing things that were unheard of a year ago, he adds, citing IBM's release of benchmark numbers for the 9370 and other mid-range systems at a Dallas analysts' briefing.

"IBM is going to be screaming by 1990. They are taking their licks now, but they are setting up to dominate by controlling all of the standards for the 1990s," says analyst Kimball Brown, formerly of the market research firm Dataquest, Inc. and now with Prudential-Bache Securities, Inc.

Brown reports that, hidden in key products, IBM has "hooks" that will let the company control standards.

He cites the proprietary Micro Channel bus and the Presentation Manager in the Personal System/2 environment as well as the implementation of VM/XA SP through microcode in the 3090E models announced in January. He maintains that IBM could use the Presentation Manager as a lever to control the Unix market and the personal computer arena.

Many of these hooks are communications oriented. While the minicomputer growth of the '60s and '70s was based largely on stand-alone or poorly networked systems, the latest efforts focus on merging departmental computers with more versatile software and enterprise networks, whether they are based on Ethernet or proprietary networks such as DEC's Decnet and IBM's Systems Network Architecture (SNA).

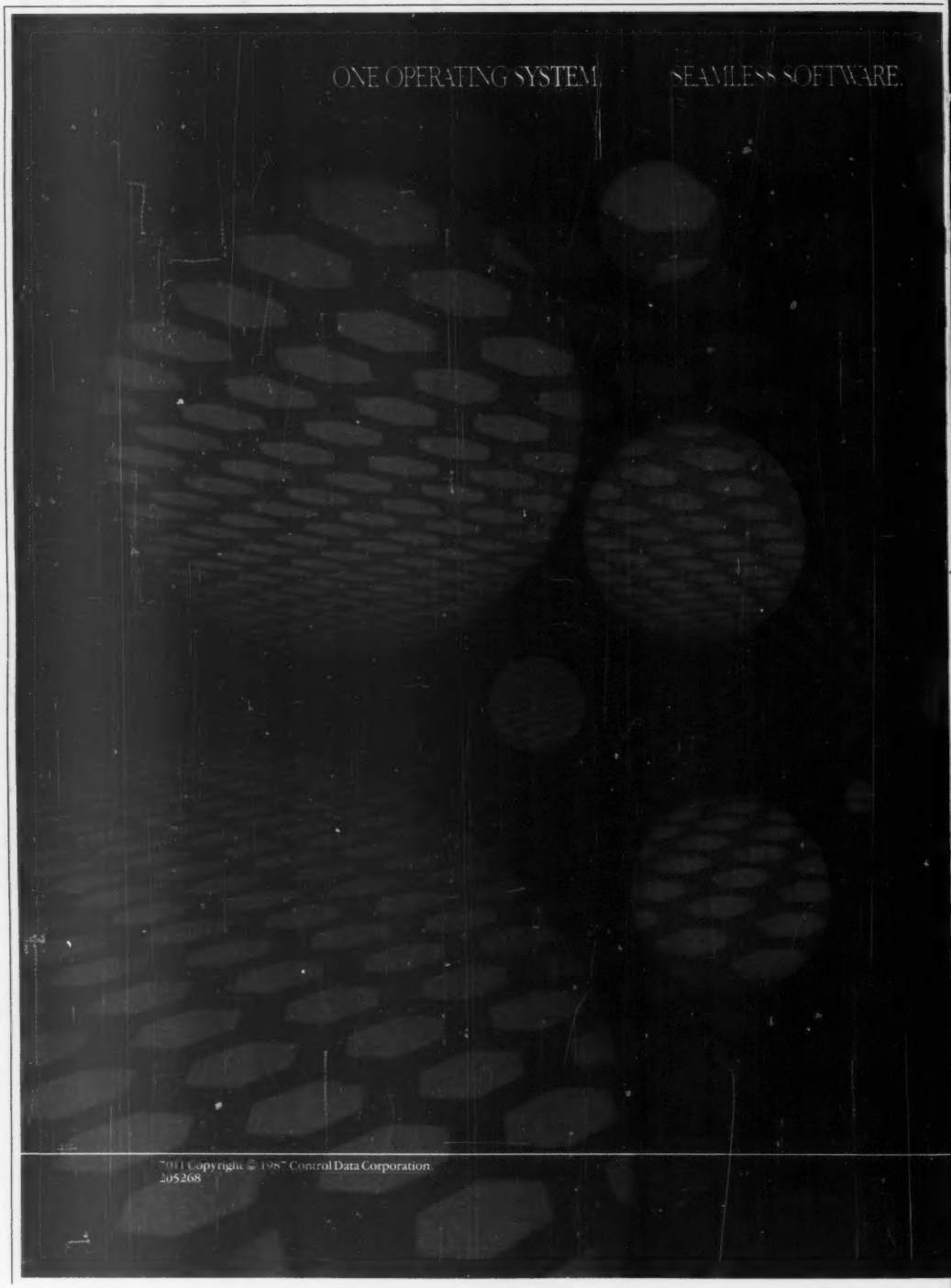
Dumb terminals down

In addition, the past year has seen continued slippage in the use of dumb terminals, be they attached to minicomputers or mainframes. Microcomputers are squeezing out dumb terminals and, at the same time, pressuring minicomputers from below.

While minicomputer vendors such as DEC and Prime Computer, Inc. boast of mainframe-class processing power, PCs based on the Intel Corp. 80386 chip now pack three times the raw CPU punch of the VAX-11s that were the heart of DEC's product line only three years ago.

Meanwhile, even in a market that most observers acknowledge to be slow, the corporate mainframe has its supporters. The most notable is IBM, which envisions a world in which its PS/2s are tied to Silverlake and 9370 minicomputers via an IBM Token-Ring network, and,

Continued on page S4



Roundup: Evaluation criteria

Comparing computers made by different vendors — or even within a single company in the cases of multi-product-line companies such as IBM or Unisys Corp. — has never been easy.

"Somebody ought to come up with some benchmark that can be universally accepted by all hardware vendors. But maybe that's utopia," says Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

Even assigning millions of instructions per second (MIPS) ratings, which tend to reflect raw CPU power, to varied systems can be risky. As Atre notes, system measurement has always been complicated by differences in operating systems and factors such as I/O and cache, and it is becoming even tougher with the availability of varied data base management systems.

Many people who evaluate systems are looking for a single set of numbers showing how all types of computers handle a particular, well-defined set of tasks. Atre suggests that the federal government, a university, a large user company or vendor should take the initiative.

In the absence of such a set of numbers, the latest edition of *Computerworld*'s annual Hardware Roundup includes MIPS ratings — either provided by vendors or, based on vendors' claims, estimated by *Computerworld* — and other performance numbers supplied by vendors in response to a questionnaire. The overall goal was to show how systems perform in selected environments.

The performance numbers indicate millions of floating-point operations per second and Dhrystone, ET1 debit-credit, Linpack and Livermore Loops benchmarks. Benchmarks were added after years of vendor complaints that MIPS ratings are meaningless.

Computerworld has tried to present a comprehensive and accurate listing, contacting vendors directly for information. However, several vendors chose not to participate in the survey, and still others provided limited details. Left with the choice of ignoring those systems or offering incomplete information, we filled in the omitted details where possible, based on the vendors' own product literature.

Among the vendors who refused to participate was Digital Equipment Corp. IBM, Hewlett-Packard Co. and Amdahl Corp. provided limited details about selected products.

Where possible, the parameters used to group computer systems with their likely competitors come from market research firm International Data Corp. (IDC) definitions.

According to IDC, large systems typically cost more than $1 million and support more than 128 users. Medium-scale systems normally support 17 to 128 users and are generally priced in the $100,000 to $1 million range. Special-purpose systems are typically high-speed scientific computers that include supercomputers, minisupercomputers and vector processing machines such as those from Cray Research, Inc. and Control Data Corp.

The roundup, which will continue during the next two issues with small-scale systems and personal computers and workstations, is intended as a guide for readers to compare products.

In the roundup charts, the designation "NA" can stand for "not applicable" as well as "not available."

JAMES CONNOLLY

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IBM regroups

CONTINUED FROM PAGE S2

eventually, to IBM 3090-class mainframes via IBM's SNA.

In addition, to serve those who need more host processing, the most powerful commercial computers ever designed — including the 3090, National Advanced Systems Corp.'s (NAS) AS/XL and Amdahl Corp.'s 5890 — have been enhanced and moved into the prime of their product lives during the past year.

These are mainframes with performance ratings of more than 70 million instructions per second (MIPS) — more than double the power of comparable systems four years ago.

Former BUNCH get face-lifts

Elsewhere in the mainframe world, three companies long associated with "big boxes" spent much of their efforts molding new images.

Burroughs Corp. and Sperry Corp. ceased to exist in mid-1986, their places being taken by a firm called Unisys Corp. And Honeywell, Inc. placed a for-sale sign on its Information Systems Division and found buyers in Compagnie des Machines Bull and NEC Corp.

Unisys spent much of the year merging work forces and, in some areas, blending product lines such as the Burroughs and Sperry Unix-based systems.

At the same time, the new company expanded its mid-range lines with the introduction of the 2200 series, which is compatible with the former Sperry 1100 mainframe family, and new models for the former Burroughs V series.

At the high end, the 1100 series sat largely unenhanced, but Unisys brought out new models of the former Burroughs A 15 and A 12 series running a new operating system, MCP/AS. MCP/AS addresses a theoretical limit of 24G bytes, compared with the 6M bytes that a single program could address under the older MCP. Unisys took advantage of MCP/AS by hiking the A 12's memory from 96M to 144M bytes and by claiming performance gains of about 20% with the operating system.

Early this month, Unisys filled out the low end of its A series with the introduction of the 9370 competitors: the A 1, A 4 and A 6.

The new Honeywell, known as Honeywell Bull, Inc., made its first moves in the upper mid-range with the introduction of the DPS 7000 as a replacement for the DPS 7 and the DPS 8000 as a successor to the DPS 8.

The restructuring of Honeywell, Burroughs and Sperry signaled the demise of the non-IBM-compatible mainframe group known as the BUNCH companies.

For the two remaining former BUNCH companies, NCR Corp. and Control Data Corp., much of the past year's action has been in the mid-range. NCR has been promoting its latest multiprocessor systems — the NCR 9800 series and the Tower 32/800. Meanwhile, CDC introduced the Cyber 180 Model 930, the company's first office environment superminicomputer.

The MIPS race continued in the IBM-compatible mainframe world with IBM announcing the 3090E models — claiming 25% to 28% price/performance gains — and Amdahl responding with its own E versions.

Amdahl and NAS both claimed higher uniprocessor performance than IBM, and both apparently matched IBM's price/performance moves. However, it remains to be seen, as analyst Brown notes, what surprises besides VM/XA SP IBM's E models have in store for the plug-compatible vendors.

> "DEC IS DOING WELL and appears to be saying, 'We are good and we can do what we want. Take it or leave it.' And what do you do if you already have DEC machines? You have to buy from DEC. DEC will get away with it just like IBM got away with increasing software prices."
>
> SHAKU ATRE
> ATRE INTERNATIONAL CONSULTANTS, INC.

One possibility Brown cites is that the E models may have components that would allow them to be upgraded to the expected next generation of IBM mainframes, code-named Summit. Brown notes also that he would not be surprised if Summit came earlier than most analysts expect — in early 1988 rather than 1989 or 1990.

In another move, IBM extended the high end of its 4381 series with the 4381 Models 21 through 24 and dropped the entry point of the 3090s to where the 4300s and 3090s overlap for the first time with the announcement of the 3090 Model 120E.

In the meantime, DEC, Prime and Tandem Computers, Inc. staked their claims to segments of the large-scale markets.

DEC, which had abandoned the mainframe business when it stopped enhancing the Decsystem-10 and Decsystem-20 in 1983, targeted the corporate data

center with its VAX 8974 and VAX 8978, which are four- and eight-CPU clusters of the VAX 8700.

DEC also boosted performance in its mid-range with the introduction of the DEC VAXBI-based VAX 8530, which, when paired with the VAX 8550, helped to effectively make obsolete the Unibus-based VAX 8600 and VAX 8650. But while adding performance kicks for some superminicomputer users, DEC also raised prices for most of its high-performance systems, including the VAX 8800 and the VAX 8700, neither of which received the power improvements.

Consultant Atre suggests, "DEC is doing well and appears to be saying, 'We are good and we can do what we want. Take it or leave it.' And what do you do if you already have DEC machines? You have to buy from DEC. DEC will get away with it just like IBM got away with increasing software prices for so long."

Two other long-time minicomputer makers that drove their product lines into the traditional mainframe class were Prime, with claims of 23 MIPS for its 6550, and Tandem, which claimed to rival the IBM 3090's transaction processing power with the VLX series.

And, finally, among other supermini vendors, Hewlett-Packard Co. began shipments of its HP 3000 Series 930, its first commercial computer using reduced instruction set computer architecture.

Data General Corp., which had announced its high-end MV/20000 in 1986, filled in the middle of its product line with the MV/15000 — the replacement for the MV/10000 and MV/8000.

Wang Laboratories, Inc. built upward and downward on the architecture of its VS 300 with a VS 7000 product line that includes the older VS 300 and a planned dual processor.

Long associated with the real-time computing market, Harris Corp.'s Computer Systems Division added a pair of Unix-based superminis to its HCX series with performances ranging up to 7.5 MIPS and the goal of extending into the more general-purpose marketplace.

Tandem's rival in on-line transaction processing, Stratus Computer, Inc., increased its transaction throughput by tenfold with the introduction of the XA 2000 family of multiprocessors. •

Super competition heats up

The past year has seen competition intensifying in supercomputing, a field long dominated by crosstown Minneapolis rivals Cray Research, Inc. and Control Data Corp., as new forces split up a booming market.

Cray and CDC's ETA Systems, Inc. subsidiary still vie in the high-performance market, where Cray holds a commanding lead. But new players have joined the competition.

"The most significant thing that has happened is the entry of many new competitors at all levels of the high-performance class," says Marcia Brooks, an analyst for International Data Corp., a Framingham, Mass., market research firm. Brooks notes that minisupercomputer vendors like Convex Computer Corp. and the massively parallel processors made by companies like BBN Advanced Computers, Inc. and Intel Corp. can chip away at Cray's dominance.

She explains that the minisuper vendors introduced the element of price into Cray's market, offering dedicated machines to individual users who in the past used supercomputers on a time-sharing basis. Cray's attempts in the past year to improve the price/performance of its Cray-2 and Cray X-MP models all are signs that the company recognizes "it can no longer be cavalier about prices," Brooks says.

Both Brooks and analyst Omri Serlin, owner of Itom International Co. in Los Altos, Calif., note that a key development has been the movement of those minisupercomputers into new markets, such as financial modeling and industrial control.

"It is simply a case of discovering new applications for existing features rather than having manufacturers change the products so they will fit," Serlin says.

Brooks says the massively parallel computer vendors as well as others testing new architectures present very specific threats to Cray. She notes that one architecture likely to draw attention in coming years is the matrix computer announced by Saxpy Computer Corp.

Meanwhile, ETA announced its ETA-10, which holds the promise of being 10 times as powerful as the older CDC Cyber 205 and more powerful than the Cray-2. However, Cray is said to be working on its own next-generation systems — the Y-MP and the Cray-3 — for introduction during the next two years, and Japanese supercomputers, in particular those from NEC Corp. and Fujitsu Ltd., are starting to make inroads into the U.S. market.

JAMES CONNOLLY

What ISDN is doing for McDonald's data networking capabilities is no small potatoes.

When McDonald's Corporation took a hard look at its telecommunications needs a few years ago, it saw 9400 restaurants in 46 countries, served by more than 20 networks. And a new restaurant opening every 17 hours.

McDonald's needed a telecommunications system that could grow with it, but one simple enough that the company could concentrate less on telecommunications and more on talking to customers.

The solution: the nation's first customer application of ISDN, the Integrated Services Digital Network, made possible by the cooperation of Ameritech's Illinois Bell and AT&T Network Systems.

McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN. To find out all that ISDN can do for you, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 2966, Morristown, N.J. 07960-1278.

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Smart forms: What electronic forms do that desk top publishing can't.

It's the difference between making forms with a computer and using forms on a computer.

Desk top publishing is a very efficient way to produce documents, including forms. It automates the *creation* of forms. But it doesn't really automate forms.

Electronic forms technology does. Electronic forms do everything paper ones do, without paperwork. You can fill them in, route them, distribute copies, approve them, revise them and file them, all on your system.

New technology from Electronic Form Systems actually *combines* your forms and your computer system — and the combination makes both more powerful.

The key: Keep the data and the form separate.

If you fill in a form created with a desk top publishing package, the data that fills the blanks becomes part of the form. With electronic forms, you *see* the form and the data together on the screen and on the printout, but *the system sees them as separate files* that can be manipulated separately.

That separation unleashes impressive power.

How a smart form helps a company work smarter.

Filling out paper forms takes a lot of time. Every process in your company is subject to the speed limit of paper. Electronic forms remove that limit.

The form appears on the computer screen. It looks just like the ones your company uses now. As the user enters information, the form helps fill itself out.

The form can do calculations with the data entered in a given blank and enter the result in another blank. For example, an invoice form can add the sales tax by itself.

The form can automatically pull in data from an existing database. When you put a customer's name on an order form, for example, the form can add the address, phone, account number, billing instructions, whatever you wish. Once on the form, this "imported" data can be modified just like data entered at the keyboard.

When the same information goes on several pages of a form, the legal description of a piece of property in a mortgage document, for example, you enter it only once. The system automatically puts it in all the right places. (A mortgage company went from six sets of documents per person per day to thirty-six.)

Information on one form can trigger the system to pull all the other forms to make up a set. To assemble an insurance policy, for example, the system can key on the state and the insured's age and automatically pull all the proper endorsements.

Desk top publishing can't do anything like this.

How you "teach" your smart form.

To tell the smart form what to do with the data entered in each blank, you create a "form map" with software from Electronic Form Systems. It doesn't require programming skills; it's less complex than a spreadsheet.

You can tell each blank:

- A formula for automatic calculation with that data and where to put the result.
- Other locations where this data should go on the form and other forms.
- What other forms should be included in the set.
- Criteria for valid data: whether it should be letters, numbers, dollars, how many digits, how many decimal places, and so forth.

How the smart form can "teach" the user.

When you tell the smart form what to do, you can also tell the user what to do. You can create individual help windows *for each blank.* When the user gets stuck, a touch of F10 brings up a window with detailed instructions on what the company wants in that blank.

Your forms become the capture point.

Most companies spend money to capture the same information twice: First when someone puts it on a form, and later when someone reads it off the form and enters it into the computer. Electronic forms end this duplication because data entered for the form can be exported to a DOS file for use in all your other applications. Data capture for the form and data capture for the computer are one.

When someone fills out an order form, for example, the sales information could be automatically sent to your inventory application. Travel expenses could be automatically copied from expense reports to a Lotus® spreadsheet in the department head's PC. Billable hours could be sent from individual time sheets into the billing and accounts receivable package.

To tell the system where to send the data, you create an "external data map" with software from Electronic Form Systems. Data can be exported (or imported) in Data Interchange Format, PRN (delimited ASCII), or System Data Format. In addition to Lotus, Electronic Form Systems supports dBase III, communications software and customer-supplied file transfer packages.

A true electronic form will eliminate hidden costs.

The smart form from Electronic Form Systems is more than a better way to make forms. It's a better way to manage information. It lets people work faster. It lets you stop handling the same information twice. And it cuts several other costs associated with paper forms. Some of those costs are visible, but the largest of them are hidden.

Visible cost — Creating forms.

With the Formcoder from Electronic Form Systems, you can create a new electronic form *and be using it* in less than two hours. No typesetting, no artwork, no printing. And it doesn't take a programmer; a good word processing operator can do it.

Visible cost — Inventorying forms.

Your company now leases thousands of square feet to store forms. And money is tied up in forms inventory, probably six figures.

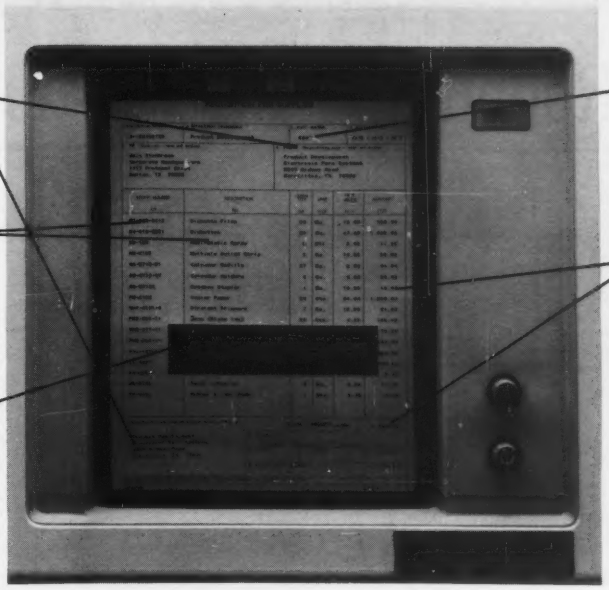
Electronic forms are stored in the

Electronic Form Systems is a division of Computer Language Research, Inc.

When the same information goes on several pages, you enter it only once. The system can automatically fill in standard information like a customer's address.

You can pull data in from other files and export data for use with other applications.

You can create help windows for each blank on a form. Then the F10 brings up a window with instructions on what the company wants in that blank.



You can set criteria for any field. The system alerts the user if the wrong type of data is entered — a letter where a number should be, for example.

The form can do calculations. For instance, it can add total costs on a requisition order and automatically place the sum in the proper space below.

To tell the smart form what to do with the data entered in each blank, you create a "form map" with software from Electronic Form Systems. It doesn't require programming skills; it's less complex than a spreadsheet.

computer so most of that money goes right to the bottom line. You can store as many as 5,000 different forms on an IBM® microcomputer and an unlimited number on a mainframe.

One insurance company projects annual savings of $1.8 million in warehousing costs alone.

These savings are significant, but the visible costs of paper forms are only the tip of the iceberg. The hidden costs can be ten, twenty, maybe fifty times greater.

Hidden cost — Using the wrong form.

There's a Murphy's law of forms: If the wrong form *can* be used, it *will* be.

With electronic forms you can control *who* uses a form, *which* form they use, and what they use it *for*.

You can restrict certain forms to certain people or departments.

Nobody will confuse two forms that look alike. They request a form by name or number and that's the form the computer gives them.

When a form is revised, you simply replace the old one with the new one in the computer.

Hidden cost — The cost of running out.

Right now, several people in your company have run out of a form they need. They're wasting time looking for more. The missing form is also *delaying revenue*, slowing the whole financial pulse of your company.

Electronic forms never run out. Supply always equals demand. One insurance company produces 15,000 policies every night using electronic forms. They are never short a single policy page.

Hidden cost — Forms obsolescence.

Needs change, laws change, and suddenly a lot of your paper forms aren't worth the paper they're printed on. One bank estimates that out-of-date forms were costing them $35,000 per month.

Electronic forms eliminate this waste entirely. When a form goes out of date, you just move it to another computer file and put the new one in its place.

Hidden cost — Forms management and enforcement.

With technology from Electronic Form Systems, the creation, management and processing of every form in your company are brought into a single integrated system. You'll get up-to-the-minute summaries of how many times a form has been used, how long since it was revised, what the current revision looks like, and so forth. Bootleg forms disappear.

Combine the power of forms and computers.

The computer has given business paperless typing, paperless filing, and paperless mailing. No large company could afford to be without them today.

Now the paperless form is here. And Electronic Form Systems offers proven hardware and software that are already working in hundreds of installations. It is the only fully integrated system capable of handling forms creation, forms management, and forms processing. You can implement it as a centralized system based on your IBM mainframe or as a distributed system using IBM microcomputers. You don't have to rewrite your applications software to use it, and it works with several different makes of printer.

Electronic forms. They do everything your paper ones do. Without the paperwork.

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Hardware Roundup: Large systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Amdahl Corp. (408) 746-6000	Model 5890-190E	March 1987	DP	IBM 3090 Model 180E	22*	NA	NA	15	32-256	3-4.5	NA	16-48	MVS/SP, VM/SP, VM/XA SF, UTS/580	NA	NA	NA	$2.625 million with 16 channels, 32M-byte memory, console, power supply
	Model 5890-200E	March 1987	DP	IBM 3090 Model 200E	33.6*	NA	NA	15	64-256	3-4.5	NA	32-64	MVS/SP, VM/SP, VM/XA SF, UTS/580	NA	NA	NA	$3.825 million with 64M-byte memory, 32 channels, console, power supply
	Model 5890-300E	June 1987	DP	IBM 3090 Model 300E	41*	NA	NA	15	64-256	3-4.5	NA	32-64	MVS/SP, VM/SP, VM/XA SF, UTS/580	NA	NA	NA	$4.5 million with 64M-byte memory, 32 channels, console, power supply
	Model 5890-400E	Fourth quarter 1987	DP	IBM 3090 Model 400E	55.3*	NA	NA	15	128-512	3-4.5	NA	64-96	MVS/SP, VM/SP, VM/XA SF, UTS/580	NA	NA	NA	$7.27 million with 128M-byte memory, 64 channels, 2 consoles, 2 power supplies
	Model 5890-600E	Fourth quarter 1987	DP	IBM 3090 Model 600E	70*	NA	NA	15	128-512	3-4.5	NA	64-128	MVS/SP, VM/SP, VM/XA SF, UTS/580	NA	NA	NA	$8.5 million with 128M-byte memory, 64 channels, 2 consoles, 2 power supplies
Control Data Corp. (612) 853-3400	Cyber 180 Model 860A	NA	SE	NA	9.5	NA	2.1M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	150-250	64	$1.24 million with 16M-byte memory, 16K-byte cache, power supplies
	Cyber 180 Model 870A (dual CPU)	NA	SE	NA	17.1	NA	4.2M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	150-250	64	$1.982 million with 16M-byte memory, 15K-byte cache, power supplies
	Cyber 180 Model 990E	NA	SE	NA	28.2 (scalar)	NA	12M[4] LP (actual)	16	16-128	12	30	29-34	NOS/VE, NOS, NOS/BE	NA	200-300	64	$2.35 million with 16M-byte memory, 32K-byte cache, power supplies
	Cyber 180 Model 995E (dual CPU)	NA	SE	NA	50.8 (scalar)	NA	24M[4] LP (actual)	16	16-128	12	30	29-34	NOS/VE, NOS, NOS/BE	NA	200-300	64	$3.815 million with 16M-byte memory, 32K-byte cache, power supplies
Digital Equipment Corp. Contact local sales office	VAX 8974	1987	DP	NA	17*	NA	NA	45	128-512	1	NA	NA	VMS	NA	NA	32	$2.6 million with 128M-byte memory, 2.5G-byte disk, tape drive, Decserver, console, operating system, Ethernet
	VAX 8978	1987	DP	NA	31*	NA	NA	45	256M-1G	1	NA	NA	VMS	NA	NA	32	$4.7 million with 256M-byte memory, 2 tape drives, 5G-byte disk, 2 Decservers
Honeywell Bull, Inc. (800) 328-5111, ext. 99	DPS 8000/81	Third quarter 1987	DP, TP	IBM 4381-Model 24	2.75*	NA	60 DC (estimate)	NA	32-128	3	NA	16	GCOS 8	NA	460	36	$675,000 with CPU, I/O processor, 16M-byte memory, service processor, console, power
	DPS 8000/82T	Third quarter 1987	DP, TP	IBM 3090 Model 180E	5.5*	NA	110 DC (estimate)	NA	32-256	3	NA	32	GCOS 8	NA	830	36	$1.3 million with 2 CPUs, 2 I/O processors, 32M-byte memory, 2 service processors, 2 consoles, power
	DPS 88/861	March 1985	DP, TP	IBM 3090 Model 150E	5.4*	NA	64 DC (estimate)	NA	32-64	3	NA	64	GCOS 8	NA	725	36	$1.74 million with CPU, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/862	March 1985	DP, TP	IBM 3090 Model 180E	9.72*	NA	117 DC (estimate)	NA	32-128	3	NA	64-128	GCOS 8	NA	1,375	36	$2.775 million with 2 CPUs, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/862T	March 1985	DP, TP	IBM 3090 Model 180E	9.72*	NA	117 DC (estimate)	NA	64-128	3	NA	64	GCOS 8	NA	1,375	36	$3.475 million with 2 CPUs, 64M-byte memory, 2 I/O processors, 2 system support facilities, power
	DPS 88/891	March 1984	DP, TP	IBM 3090 Model 180E	14.6*	NA	97 DC (estimate)	NA	32-64	3	NA	64	GCOS 8	NA	1,150	36	$2.85 million with CPU, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/892	March 1984	DP, TP	IBM 3090 Model 200E	26.3*	NA	176 DC (estimate)	NA	32-128	3	NA	64-128	GCOS 8	NA	2,080	36	$3.81 million with 2 CPUs, 32M-byte memory, I/O processor, system support facility, power
	DPS 88/892T	March 1984	DP, TP	IBM 3090 Model 200E	26.3*	NA	176 DC (estimate)	NA	64-128	3	NA	128	GCOS 8	NA	2,080	36	$4.51 million with 2 CPUs, 64M-byte memory, 2 I/O processors, 2 system support facilities, power
	DPS 90/91	Fourth quarter 1984	DP, SE, TP	IBM 3090 Model 180E	10.8*	27 (P)	137 DC (estimate); 5M LP, 3.84M LL (actual)	NA	32-128	3	16	32	GCOS 8	NA	1,675	36 (72 in SE)	$3.55 million with CPU, 32M-byte memory, I/O processor, system control center, power
	DPS 90/92	Second quarter 1985	DP, SE, TP	IBM 3090 Model 300E	19.4*	54 (P)	247 DC (estimate); 10M LP, 7.68M LL (actual)	NA	32-128	3	32	64	GCOS 8	NA	3,020	36 (72 in SE)	$4.5 million with 2 CPUs, 32M-byte memory, I/O processor, system control center, power
	DPS 90/92T	Third quarter 1985	DP, SE, TP	IBM 3090 Model 300E	19.4*	54 (P)	247 DC (estimate); 10M LP, 7.68M LL (actual)	NA	64-256	3	32	64	GCOS 8	NA	3,020	36 (72 in SE)	$5.63 million with 2 CPUs, 64M-byte memory, 2 I/O processors, 2 system control centers, power
	DPS 90/93	Third quarter 1986	DP, SE, TP	IBM 3090 Model 400E	28*	81 (P)	356 DC (estimate); 15M LP 11.52M LL (actual)	NA	64-256	3	48	64	GCOS 8	NA	4,270	36 (72 in SE)	$6.5 million with 3 CPUs, 64M-byte memory, 3 I/O processors, 2 system control centers, power

*_Computerworld_ estimates based on vendor-supplied information.
[1]Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).
[2]Full-precision millions of floating-point operations per second (MFLOPS). Sustained (S); peak (P).
[3]Per-second performance ratings, based on the following industry-standard benchmarks: Dhrystone, Version 1.1, peephole optimization only (DH); Debit-Credit (ET1) transactions based on 95% subsecond responses (DC); Linpack 100 x 100 full-precision (LP); Livermore Loops harmonic mean, 14 loops (LL). Vendors supplied either actual or estimated benchmark figures.
[4]Running under NOS/VE.
[5]Local-area network interfaces.
[6]Unisys uses data link processors in place of conventional channels on these systems.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Honeywell Bull, Inc. (800) 328-5111, ext. 99	DPS 90/94	Fourth quarter 1986	DP, SE, TP	IBM 3090 Model 600E	36.7*	108 (P)	466 DC (estimate); 20M LP, 15.36M LL (actual)	NA	64-256	3	64	64	GCOS 8	NA	5,365	36 (72 in SE)	$7.6 million with 4 CPUs, 64M-byte memory, 4 I/O processors, 2 system control centers, power
IBM Contact local sales office	3090 Model 120E	Oct. 1987	DP	NA	7.5*	NA	NA	18.5	32	3-4.5	NA	16-24	MVS, VM	NA	NA	64	$985,000 with controller, 32M-byte memory, 16 channels
	3090 Model 150E	1987	DP	NA	10.1*	NA	NA	18.5	32-64	3-4.5	NA	16-32	MVS, VM	NA	NA	64	$1.65 million with 32M-byte memory
	3090 Model 180E	1987	DP	NA	15.6*	NA	NA	18.5	32-64	3-4.5	NA	16-32	MVS, VM	NA	NA	64	$2.6 million with 32M-byte memory
	3090 Model 200E	1987	DP	NA	31.2*	NA	NA	18.5	32-64	3-4.5	NA	32-64	MVS, VM	NA	NA	64	$4.5 million with 32M-byte memory
	3090 Model 300E	1987	DP	NA	46.9*	NA	NA	18.5	64-128	3-4.5	NA	32-64	MVS, VM	NA	NA	64	$5.6 million
	3090 Model 400E	1987	DP	NA	61.5*	NA	NA	18.5	128-256	3-4.5	NA	64-128	MVS, VM	NA	NA	64	$8.375 million with 128M-byte memory, 64 channels
	3090 Model 600E	1987	DP	NA	79*	NA	NA	18.5	128-256	3-4.5	NA	64-128	MVS, VM	NA	NA	64	$10.3 million
ICL Co. 061-223-1301 (Manchester, England)	Series 39 Level 60/1	Aug. 1986	DP, TP	IBM 3090 Model 120E, VAX 8700	7.1	NA	36 DC (estimate)	25	16-96	3	NA	3-9[5]	VME	8,000	1,100	32	$818,600 with 16M-byte memory
	Series 39 Level 60/2	Aug. 1987	DP, TP	IBM 3090 Model 180E, VAX 8974	14	NA	68 DC (estimate)	25	16-96	3	NA	3-18[5]	VME	8,000	2,200	32	$1.68 million with 32M-byte memory
	Series 39 Level 80/1	Nov. 1985	DP, TP	IBM 3090 Model 150E	17.5	NA	53 DC (estimate)	25	16-128	3	NA	3-9[5]	VME	8,000	1,800	32	$1.396 million with 16M-byte memory
	Series 39 Level 80/2	Nov. 1986	DP, TP	IBM 3090 Model 200, VAX 8978	34	NA	100 DC (estimate)	25	16-128	3	NA	3-18[5]	VME	8,000	3,200	32	$2.837 million with 32M-byte memory
	Series 39 Level 80/3	Sept. 1987	DP, TP	IBM 3090 Model 200E	51	NA	130 DC (estimate)	25	NA	3	NA	3-18[5]	VME	8,000	4,500	32	$4.239 million with 48M-byte memory
	Series 39 Level 80/4	April 1988	DP, TP	IBM 3090 Model 300E	67	NA	NA	25	NA	3	NA	3-18[5]	VME	8,000	6,400	32	$5.7 million with 64M-byte memory
NCR Corp. Contact local sales office	V-8800 series	NA	DP	IBM 4381, 3090	1.5-12	NA	NA	38	4-64	1.5	16-256	16-256	VRX	NA	NA	32	$290,000-$2.199 million with 1 to 8 processors, 4M- to 32M-byte memory, 16 to 32 channels, 1 to 4 dual consoles
National Advanced Systems Corp. (408) 970-1000	AS/XL-50	March 1987	DP	IBM 3090 series	22*	NA	NA	18	32M-1G	3-6	NA	16-48	MVS/XA, MVS/SP	NA	NA	32-64	$3.05 million with CPU, console, 32M bytes, 16 channels, power
	AS/XL-60	May 1986	DP	IBM 3090 series	28*	NA	NA	18	64M-1G	3-6	NA	32-64	MVS/XA, MVS/SP	NA	NA	32-64	$4.35 million with CPU, console, power, 60M bytes, 32 channels
	AS/XL-70	March 1987	DP	IBM 3090 series	35*	NA	NA	18	64M-1G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$5.28 million with CPU, console, power, 64M bytes, 32 channels
	AS/XL-80	Aug. 1986	DP	IBM 3090 series	50*	NA	NA	18	64M-1G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$7.2 million with CPU, console, power, 64M bytes, 32 channels
	AS/XL-90	1987	DP	IBM 3090 series	67.2*	NA	NA	18	128M-2G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$9.9 million with CPU, 2 consoles, power, 128M bytes, 48 channels
	AS/XL-100	1987	DP	IBM 3090 series	81.2*	NA	NA	18	128M-2G	3-6	NA	NA	MVS/XA, MVS/SP	NA	NA	32-64	$12.69 million with CPU, 2 consoles, power, 128M bytes, 48 channels
Prime Computer, Inc. (800) 343-2540, (800) 322-2450 (Mass.)	Model 6550	Fourth quarter 1987	DP, SE, OA, TP	VAX 8974, IBM 3090 Model 180E	23.6	NA	NA	44	32-64	2.46	8	0	Primos	254	NA	32	$804,000 with 32M-byte memory, 770M-byte disk, color system console, operating system
Tandem Computers, Inc. (408) 726-6000	Nonstop VLX300 series (2-16 CPUs)	April 1986	TP	IBM 4381 Model 13	6-48	NA	14-28 DC (actual)	83.3	32-256	1.2-5	NA	2-4	Guardian 90	NA	NA	32	$585,000 with 2 CPUs, 16M-byte memory, 1.6G-byte disk, terminal, tape drive, power supplies
	Nonstop VLX800 series (8-32 CPUs)	May 1987	TP	IBM 3090	24-96	NA	58-200 DC (actual)	83.3	128-512	1.2-5	NA	8-32	Guardian 90	NA	NA	32	$2.141 million with 8 VLX CPUs, 64M-byte memory, 2.7G-byte disk, tape drive, terminal, power supplies
Unisys Corp. (formerly Burroughs Corp.) (313) 351-3000	A 12	Second quarter 1986	DP	IBM 3090 Model 150E	7.6*	NA	NA	65	24-144	3	NA	16[6]	MCP/AS	NA	NA	48	$1.4 million with CPU, I/O processor, 24M-byte memory, console
	A 15 FX	Second quarter 1987	DP	IBM 3090 Model 180E	15.2*	NA	NA	65	24-96	3	NA	48[6]	MCP/AS	NA	NA	48	$2.94 million with CPU, I/O processor, 24M-byte memory, console
	A 15 IX	Second quarter 1987	DP	IBM 3090 Model 200E	27.7*	NA	NA	65	24-192	3	NA	96[6]	MCP/AS	NA	NA	48	$4.57 million with 2 CPUs, 2 I/O processors, 24M-byte memory, console
	A 15 KX	Second quarter 1987	DP	IBM 3090 Model 300E	39.6*	NA	NA	65	24-192	3	NA	96[6]	MCP/AS	NA	NA	48	$6.12 million with 3 CPUs, 2 I/O processors, 24M-byte memory, console
	A 15 MX	Second quarter 1987	DP	IBM 3090 Model 400E	51.1*	NA	NA	65	24-192	3	NA	96[6]	MCP/AS	NA	NA	48	$7.665 million with 4 CPUs, 2 I/O processors, 24M-byte memory, console
Unisys (formerly Sperry Corp.) (215) 542-4011	1100/91 SV	July 1985	DP, TP	IBM 3083 EX	5.52*	NA	NA	30	8-16	2.1	NA	12	OS/1100	NA	NA	36	$1.8 million with 8M-byte memory, console, 12 channels, power supply
	1100/91	Dec. 1983	DP, TP	IBM 3090 Model 120E	7.5*	NA	NA	30	8-64	2.1	NA	12	OS/1100	NA	NA	36	$2.4 million with 8M-byte memory, console, 12 channels, power supply
	1100/92 SV	July 1985	DP, TP	IBM 3090 Model 150E	10.2*	NA	NA	30	8-64	2.1	NA	12	OS/1100	NA	NA	36	$2.7 million with 2 CPUs, 16M-byte memory, 2 consoles, 12 channels, power supply
	1100/92	Dec. 1983	DP, TP	IBM 3090 Model 180E	14.04*	NA	NA	30	8-64	2.1	NA	12	OS/1100	NA	NA	36	$3.6 million with 2 CPUs, 16M-byte memory, 2 consoles, 12 channels, power supply
	1100/93	Dec. 1983	DP, TP	IBM 3090 Model 180E, Model 200E	20*	NA	NA	30	8-64	2.1	NA	24	OS/1100	NA	NA	36	$5.1 million with 3 CPUs, 32M-byte memory, 3 consoles, 24 channels, 2 power supplies
	1100/94	Dec. 1983	DP, TP	IBM 3090 Model 200E	25*	NA	NA	30	8-64	2.1	NA	24	OS/1100	NA	NA	36	$6.7 million with 4 CPUs, 64M-byte memory, 4 consoles, 24 channels, 2 power supplies

Hardware Roundup: Special-purpose systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Alliant Computer Systems Corp. (617) 486-4950	FX/1	Sept. 1985	SE	VAX 8600	5	8.6 (S), 11.8 (P)	5,000 DH (actual), 2.0M LP (actual)	170	8-64	2.5	NA	2	Concentrix	16	16	64	$99,500 with 16M-byte memory, console, 536M-byte disk, tape drive, 2 ports
	FX/8 (1-8 processors)	June 1985	SE	VAX 8800, IBM 3090	40	68.5 (S), 94.4 (P)	5,000 (per processor) DH (actual), 11M LP (actual), 7.6M LL (actual)	170	16-256	2.5	NA	12	Concentrix	128	32	64	$285,000 with 16M-byte memory, console, 536M-byte disk, tape drive, 2 ports
Amdahl Corp. (408) 746-7050	Model 500 vector processor	Nov. 1984	SE	IBM 3090 Model 200	NA	143 (P)	15M LP (actual)	7-14	32-128	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$3 million with 32M-byte memory, 16 channels, vector unit, scalar unit
	Model 1100 vector processor	Sept. 1985	SE	IBM 3090 Model 300	NA	286 (P)	17M LP (actual)	7-14	32-128	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$4 million with 32M-byte memory, 16 channels, vector unit, scalar unit
	Model 1200 vector processor	March 1986	SE	IBM 3090 Model 400	NA	571 (P)	19.5M LP (actual)	7-14	64-256	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$5.5 million with 64M-byte memory, 16 channels, vector unit, scalar unit
	Model 1400 vector processor	NA	SE	NA	NA	1,142 (P)	NA	7-14	64-256	3	256	32	MVS/XA with Amdahl VP/XA	NA	NA	16-128	$6 million with 64M-byte memory, 16 channels, vector unit, scalar unit
BBN Advanced Computers, Inc. (617) 497-3700	Butterfly Parallel Processor	1981	DP, SE	NA	Up to 250	80 (S)	NA	NA	Up to 1G	NA	256	256	Chrysalis	254	4-16	32	$375,000 with 32M-byte memory, 32 channels, operating system
Convex Computer Corp. (214) 952-0200	C-1 series	1985	SE	NA	6.4	16 (S), 20 (P)	7,249 DH (actual), 3.1M LP (actual)	100	16-64	4	128	5	Unix 4.2	128	10-60	64	$350,000 with 16M-byte memory, 16 ports, 500M-byte disk, tape drive
Cray Research, Inc. (612) 333-5889	Cray X-MP/14 SE	1987	DP, SE	IBM 3090	NA	160* (P)	NA	8.5	Up to 32	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$2.5 million with power disk unit
	Cray X-MP/1	1982	SE	NA	NA	200-333* (P)	NA	8.5	32-128	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$5.5 million with 32M-byte memory
	Cray X-MP/2	1982	SE	NA	NA	400-666 (P)	NA	8.5	16-128	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$6 million with 16M-byte memory
	Cray X-MP/4	1982	SE	NA	NA	1.2G FLOPS (P)	NA	8.5	32-128	5.9-9.6	NA	NA	Unicos, COS	NA	NA	64	$12 million with 32M-byte memory
	Cray-2S series	Third quarter 1987	SE	IBM 3090	NA	2.1G FLOPS (P)	NA	4.1	512M-1G	9.6	20-40	2-4	Unicos	NA	NA	64	$12 million with 512M-byte memory
	Cray-2	1985	DP	NA	NA	1.73G FLOPS (P)	NA	4.1	Up to 2G	9.6	20-40	2-4	Unicos	NA	NA	64	$15.5 million with Cray-2/4-256 system
CSP, Inc. (800) 325-3110 (617) 272-6020 (Mass.)	Mini-MAP XL array processor	May 1982	DP	NA	NA	38 (P)	NA	125	Up to 16	NA	4	NA	VMS, MicroVMS, RSX	4	1	32	$32,500 with 5M-byte memory, power supply, Fortran cross-compiler
ETA Systems, Inc. (612) 642-3421	ETA-10 (1-10 CPUs)	April 1987	DP, SE	NA	NA	4G FLOPS (S), up to 10G FLOPS (P)	NA	10.5-7	32 per CPU plus 512M-4G shared memory	96M bit/sec.	18	5	ETA VSOS, Unix	5,000	100	64	$5 million to $22.8 million
Floating Point Systems, Inc. (503) 641-3151	M64 series minisuper-computers	1981	SE	NA	NA	6-341 (P)	5.9M (M64/60) LP (actual)	53 (M64/60)	8-128	2	6	6	SJE	NA	12	64	$100,000 with 8M-byte memory, disk subsystem, Fortran compiler
	T series (up to 16,384 nodes)	April 1986	SE	NA	7.5 per node	12 per node (S), 12 per node (P)	NA	67	1 per node	2	NA	NA	FPS, TSE	NA	NA	64	$1 million with 16 nodes, front-end computer, backup disks, power supplies
Gould, Inc. Computer Systems Division (800) GOULD-10	Sel-Connection	March 1987	SE	Microvax	3.262-26.096	0.166 (S)	0.166M LP (actual)	150	2-144	NA	256-2,048	16-128	MPX-32	2,048	128	32	$60,000
	NP1 Model 110	June 1987	DP	VAX 8000 series	10	NA	NA	52	32M-4G	3	256	128	Unix System V, Unix 4.3	256	128	32	$375,000 with processor 64M-byte memory, controllers

*_Computerworld_ estimates based on vendor-supplied information.
[1]Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).
[2]Full-precision millions of floating-point operations per second (MFLOPS). Sustained (S); peak (P).
[3]Per-second performance ratings, based on the following industry-standard benchmarks: Dhrystone, Version 1.1, peephole optimization only (DH); Debit-Credit (ET1) transactions based on 95% subsecond responses (DC); Linpack 100 x 100 full-precision (LP); Livermore Loops harmonic mean, 14 loops (LL). Vendors supplied either actual or estimated benchmark figures.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Gould, Inc. Computer Systems Division (800) GOULD-10	NP1 Model 110 SP	June 1987	SE	VAX 8000 series	13.1	10 (S), 20 (P)	16,700 DH (actual), 3.15M LP (actual)	52	32M-4G	3	256	7	Unix System V, Unix 4.3	256	128	64	$435,000 with processor, 64M-byte memory, controllers
	NP1 Model 120	June 1987	DP	VAX 8000 series	20	NA	NA	52	32M-4G	3	NA	7	Unix System V, Unix 4.3	256	128	32	$460,000 with processor, 64M-byte memory, controllers
	NP1 Model 120 SP	June 1987	SE	VAX 8000 series	26.2	20 (S), 40 (P)	33,400 DH (actual), 6.30M LP (actual)	52	32M-4G	3	256	7	Unix System V, Unix 4.3	256	128	64	$545,000 with processor, 64M-byte memory, controllers
	NP1 Model 240	June 1987	DP	VAX 8000 series	40	NA	NA	52	32M-4G	3	512	14	Unix System V, Unix 4.3	512	256	32	$926,000 with 4 processors, 128M-byte memory, controllers
	NP1 Model 240 SP	June 1987	SE	VAX 8000 series	52.4	40 (S), 80 (P)	66, 800 DH (estimate), 12.6M LP (estimate)	52	32M-4G	3	512	14	Unix System V, Unix 4.3	512	256	64	$1.01 million with 4 processors, 128M-byte memory, controllers
	NP1 Model 360	June 1987	DP	VAX 8000 series	60	NA	NA	52	32M-4G	3	768	21	Unix System V, Unix 4.3	768	384	32	1.22 million with 6 processors, 192M-byte memory, controllers
	NP1 Model 360 SP	June 1987	SE	VAX 8000 series	78.6	60 (S), 120 (P)	100,200 DH (estimate), 18.9M LP (estimate)	52	32M-4G	3	768	21	Unix System V, Unix 4.3	768	384	64	$1.475 million with 6 processors, 192M-byte memory, controllers
	NP1 Model 480	June 1987	DP	VAX 8000 series	80	NA	NA	52	32M-4G	3	1,024	28	Unix System V, Unix 4.3	1,024	512	32	$1.6 million with 8 processors, 256M-byte memory, controllers
	NP1 Model 480 SP	June 1987	SE	VAX 8000 series	104.8	80 (S), 160 (P)	133,600 DH (estimate), 25.2M LP (estimate)	52	32M-4G	3	1,024	28	Unix System V, Unix 4.3	1,024	512	64	$1.940 million with 8 processors, 256M-byte memory, controllers
Honeywell-NEC Supercomputers, Inc. (617) 270-7600	SX 2 series (3 models)	1987	SE	NA	NA	330M-1.3G (P)	NA	6	Up to 8G	3	NA	NA	SXCP	NA	NA	32-64	$7 million to $20 million
Integrated Inference Machines, Inc. (714) 978-6776	SM 45000	Jan. 1987	DP, SE	NA	NA	15 (S), 30 (P)	NA	67	Up to 240	NA	2	10	Common LISP, IMS-DOS	1	1	40	$39,000 with 10M-byte memory, 33M-byte disk, 2 processors
Intel Scientific Computers (503) 629-7629	IPSC series	July 1985, Jan. 1988	SE	NA	512	427 (P)	90M (64 CPUs) LP (estimate)	NA	64M-1G	NA	NA	1-448	Unix	4	1-8	32-64	$45,950 with 140M-byte disk, 1 tape drive, 9 ports
Multiflow Computer, Inc. (203) 488-6090	Trace 7/200	July 1987	SE	NA	53	6.0 (S), 15 (P)	6.0M LP (actual)	130	16-512	3-12	64	2	Unix 4.3	64	48	256	$299,500 with 16M-byte memory, 515M-byte disk, processor, operating system, Fortran compiler
National Advanced Systems Corp. (415) 962-6381	AS/XL vector series	Oct. 1986	SE	IBM 3090	NA	108 (per processor) (P)	NA	18	512M-2G	3-6	NA	Up to 128	IBM-compatible operating systems	NA	NA	32-64	$3.6 million to $14.2 million with host CPU, vector processor
Numerix Corp. (617) 964-2500	NMX-464 array processor	April 1987	SE	NA	NA	12 (P)	2.0M LP (actual)	125-250	Up to 64	NA	3	NA	VMX, Ultrix	NA	NA	64	$55,000
	NMX-432 array processor	Aug. 1983	SE	NA	NA	30 (32-bit) (P)	NA	100	Up to 64	NA	4	NA	VMX, Ultrix	1	1	32	$64,000
Pixar (415) 499-3600	Pixar Image Computer	Oct. 1985	SE	NA	40	NA	NA	100	24-48	NA	NA	NA	Unix	1	NA	16	$79,000
Scientific Computer Systems Corp. (619) 546-1212	SCS-40	July 1986	SE	NA	18	40 (S), 44 (P)	8M LP (actual)	45	8-32	1.8-12	NA	8	CTSS	32	15	64	$575,000 with 16M-byte memory
Star Technologies, Inc. (800) 782-7005	ST-50 array processor	Oct. 1985	SE	NA	NA	50 (S), 50 (P)	NA	80	Up to 4G	8	3	3	Attached host operating system	16	1	32	$115,000 with 8M-byte memory, host interface, power supply
	ST-100 array processor	July 1983	SE	NA	NA	100 (S), 100 (P)	NA	40	Up to 4G	8M	7	7	Attached host operating system	NA	1	32	$265,000 with 8M-byte memory, host interface, power supply
Symbolics, Inc. (617) 621-7500	3620 Symbolic Processing System	1986	DP	NA	NA	NA	NA	NA	4-16	NA	2	NA	Genera	NA	1	36	$35,900 with processor, 190M-byte disk, 4M-byte memory
	3650	1986	DP	NA	NA	NA	NA	NA	4-64	NA	2	NA	Genera	1	1	36	$42,000 with processor, 190M-byte disk
	3675	1985	DP	NA	NA	NA	NA	NA	4-28	NA	NA	NA	Genera	1	1	36	$80,000 with processor, 5.5M-byte drive
Teradata Corp. (213) 827-8777	DBC/1012 (3-1,024 CPUs) data base machine	Dec. 1983	DP	IBM 3090	3-1,024	NA	NA	125	NA	1.8	1-512	NA	Teradata operating system	61,440	700	32	$165,000 with 6M-byte memory, 1G-byte disk

Hardware Roundup: Medium-scale systems

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
AT&T Contact local sales office	3B4000 (1-4 CPUs)	March 1986	DP, TP	NA	1.6-43	NA	NA	NA	4-16 (per CPU)	NA	NA	NA	Unix System V, Rel. 3.1.1	300	NA	32	$187,000 with 8M-byte master CPU, 4M-byte adjunct CPU, 600M-byte disk, tape drive
Celerity Computing (800) 433-4481 (800) 443-9940 (Calif.)	C1230	Nov. 1985	DP, SE	VAX 8500	10	1.5 (P)	0.58M LP (actual)	100	4-24	2.3	128	2	Unix 4.3, Unix System V	128	70	32	$75,000 with CPU, 4M-byte memory, 337M-byte disk, operating system
	C1260	Dec. 1985	SE	VAX 8600	20	3(P)	0.88M LP (actual)	100	4-24	2.3	256	2	Unix 4.3	256	150	32	$110,000 with CPU, 4M-byte memory, disk, operating system
Computer Consoles, Inc. (800) 345-1942 (800) 237-4552 (Calif.)	Power 6/32S	Jan. 1987	OA	VAX 8250	5	NA	NA	100	4-16	10M bit/sec.	96	5	CCI System V	64	NA	32	$89,950 with CPU, 4M-byte memory, 380M-byte disk, controller, operating system
	Power 6/32X	July 1984	SE	VAX 8350	8	0.5 (S), 0.5 (P)	NA	100	16-32	14.4M bit/sec.	384	22	CCI System V	128	NA	32	$173,000 with CPU, floating-point processor, 16M-byte memory, controller, operating system
	Power6/32EX	NA	OA	VAX 8250	5	NA	NA	100	16-32	14.4M bit/sec.	384	22	CCI System V	64	NA	32	$145,000 with CPU, floating-point processor, 8M-byte memory, disk, controller, operating system
	Power 6/32SX	Jan. 1987	OA	VAX 8350	8	NA	NA	100	4-16	10M bit/sec.	96	5	CCI System V	96	NA	32	$109,950 with CPU, 4M-byte memory, 380M-byte disk, controller, operating system
	Power 6/32MP	Feb. 1987	SE	VAX 8700	15	NA	NA	100	16-32	14.4M bit/sec.	384	22	CCI System V	180	NA	32	$257,000 with 2 floating point processors, 16M-byte memory, disk, controller, operating system
Computer Designed Systems, Inc. (612) 545-2855	Adviser series Model 2200/2900	1985	DP	IBM 4381; VAX 8600, 8800	16	NA	NA	75 standard, 25 optional	4-64	3.5-5	32 per channel	NA	Avox, Unix	400	160-270	64	$135,000 with CPU, 12M-byte memory
Concurrent Computer Corp. (800) 631-2154	Model 3230XP	1985	DP, SE, TP	VAX 8250	1	1 (S)	4.6 DC (actual)	260	1-16	3	16	NA	OS/32, Xelos	128	64	32	$93,500 with 2M-byte memory
	Model 3230MPS (1-6 CPUs)	1985	DP, SE, TP	VAX 8350, 8530	1.9-5.3	1.9-5.3 (S)	4.6 DC (actual)	200	3-16	3	16	NA	OS/32	128	64	32	$140,000 with 2M-byte memory
	Model 3252XP	1985	DP, SE, TP	VAX 8350	1.4	1.4 (S)	4.9 DC, 0.17 LP (actual)	260	2-16	3	32	NA	OS/32, Xelos	256	128	32	$171,500 with 2M-byte memory
	Model 3260MPS (1-10 CPUs)	1985	DP, SE, TP	VAX 8550, 8700	2.2-9	2.2-9 (S)	5.0 DC (actual)	260	2-16	3	32	NA	OS/32	256	100	32	$200,000 with 2M-byte memory
	Model 3280MPS (1-6 CPUs)	1986	DP, SE, TP	VAX 8550, 8700, 8800	6.4-33.8	6.4-33.8 (S)	4,500 DH, 10.8 DC, 0.87 LP (actual)	100	2-16	3	32	NA	OS/32	512	100	32	$235,000 with 8M-byte memory
Control Data Corp. (612) 853-3400	Cyber 180 Model 930-11	NA	DP, SE	NA	1.8	NA	0.37M LP (actual)	50	8-64	1.8	10	12	NOS/VE	NA	40-60	64	$59,900 with 32K-byte cache, 8M-byte memory, power supplies
	Cyber 180 Model 930-31	NA	DP, SE	NA	3	NA	0.58M[4] LP (actual)	50	8-64	1.8	10	12	NOS/VE	NA	50-100	64	$125,900 with 32K-byte cache, 8M-byte memory, power supplies
	Cyber 180 Model 840A	NA	DP, SE	NA	4.7	NA	0.99M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	100-200	64	$580,000 with 16M-byte memory, 16K-byte cache, power supplies
	Cyber 180 Model 850A	NA	DP, SE	NA	6.7	NA	1.6M[4] LP (actual)	16	16-128	12	30	24-34	NOS/VE, NOS, NOS/BE	NA	100-200	64	$830,000 with 16M-byte memory, 16K-byte cache, power supplies
Convergent Technologies, Inc. (408) 434-2846	S/1280 (1-4 CPUs)	Oct. 1983	DP	VAX 8550	2.2-8.8	NA	NA	300	2-24	5M-24M bit/sec.	160	NA	Unix V.2, Unix V.3	128	40	32	$30,000 with 2M-byte memory, 10 ports, 85M-byte disk, tape, power supply, operating system
Data General Corp. (617) 878-7755	MV/15000 Model 8	Dec. 1986	DP, SE, OA, TP	VAX 8530; IBM 9375 Model 60	3	0.4450 (S)	2,702 DH (actual)	85	4-32	2.2	416	2	AOS/VS, DG/VX, AOS/RT32	150	40-80	32	$57,200 with 4M-byte memory, 2 channels, power supply, operating system
	MV/15000 Model 10	Dec. 1986	DP, SE, OA, TP	VAX 8530; IBM 9377 Model 90	4.4	0.5876 (S)	4,672 DH (actual)	85	4-32	2.2	416	2	AOS/VS, DG/VX, AOS/RT32	250	60-120	32	$123,100 with power supply, 2 channels, 8M-byte memory, operating system
	MV/15000 Model 20	Dec. 1986	DP, SE, OA, TP	VAX 8550; IBM 4381 Model 12	6.8	0.7262 (S)	8,928 DH (actual)	85	4-32	2.2	416	2	AOS/VS, DG/VX, AOS/RT32	300	80-160	32	$204,500 with 8M-byte memory, power supply, operating system
	MV/20000 Model 1	March 1986	DP, SE, OA, TP	VAX 8700	6.8	0.7262 (S)	8,928 DH (actual)	85	Up to 64	2.2	1,008	5	AOS/VS, DG/VX, AOS/RT32	400	100-250	32	$271,000 with 16M-byte memory, power supply, operating system
	MV/20000 Model 2	Nov. 1986	DP, SE, OA, TP	VAX 8800	13.3	1.475 (S)	15,833 DH (actual)	85	Up to 64	2.2	1,008	5	AOS/VS	800	150-350	32	$374,000 with 16M-byte memory, power supply, operating system
Datapoint Corp. (512) 699-7000	Model 7900 Starship II	Sept. 1986	DP, OA	IBM 9375 Model 60, IBM 9877 Model 90; VAX 8250, 8530	1.5-3	NA	NA	100	4-16	1.5-5	Up to 3,060	3-16	Datapoint RMS/XA	250	50-100	32	$79,900 with 4M-byte memory, 2 CPUs, 2 I/O ports, power supply

* *Computerworld* estimates based on vendor-supplied information.
[1]Commercial data processing (DP); scientific/engineering (SE); office automation (OA); on-line transaction processing (TP).
[2]Full-precision millions of floating-point operations per second (MFLOPS). Sustained (S); peak (P).
[3]Per-second performance ratings, based on the following industry-standard benchmarks: Dhrystone, Version 1.1, peephole optimization only (DH); Debit-Credit (ET1) transactions based on 95% subsecond responses (DC); Linpack 100 x 100 full-precision (LP); Livermore Loops harmonic mean, 14 loops (LL). Vendors supplied either actual or estimated benchmark figures.
[4]Local-area network interfaces.
[5]Unisys uses data link processors in place of conventional channels on these systems.

The companies included in this chart responded to a recent written survey conducted by *Computerworld*. Further product information is available from the vendors.

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Digital Equipment Corp. Contact local sales office	VAX 8350	1987	DP	NA	2.3*	NA	NA	NA	32-128	1	NA	NA	VMS	NA	24-96	32	$124,000 with 32M-byte memory, operating system
	VAX 8530	1987	DP	NA	4*	NA	NA	NA	32-256	1	NA	NA	VMS	NA	48-192	32	$342,000 with 32M byte memory, operating system
	VAX 8550	1986	DP	NA	6*	NA	NA	45	32-256	1	NA	NA	VMS	NA	72-320	32	$506,000 with 32M-byte memory, operating system
	VAX 8700	1986	DP	NA	6*	NA	NA	45	48-256	1	NA	NA	VMS	NA	72-320	32	$592,000 with 48M-byte memory, operating system
	VAX 8800	1986	DP	NA	12*	NA	NA	45	48-256	1	NA	NA	VMS	NA	108-480	32	$885,000 with 48M-byte memory, operating system
Edge Computer Corp. (602) 951-2020	Edge 1 Model 500	Jan. 1986	SE, TP	VAX 8600	6	NA	NA	130	8-64	NA	Up to 200	NA	Unix System V.2	200	64-128	32	$100,000 with 8M-byte memory, 337M-byte disk, cabinet
	Edge 1100	July 1987	SE, TP	VAX 8650	6	NA	NA	130	8-64	NA	200	NA	Unix V and Pick	256	96-250	32	$105,000 with 8M-byte memory, 600M-byte disk, cabinet
	Edge 1200	Aug. 1982	SE, TP	VAX 8800	11	NA	NA	130	8-64	NA	Up to 500	NA	Unix V.2, Pick	500	250-300	32	$125,000 with 8M-byte memory, 600K-byte disk, cabinet
Encore Computer Corp. (617) 460-0500	Multimax 120 (2-20 CPUs)	Dec. 1985	DP, SE	VAX 8700, IBM 4381	1.5-15	Up to 5 (S), up to 6 (P)	1,300 DH (actual)	0.80M (per CPU) LP (actual)	4-128	1.5-4	NA	15	Umax 4.2, Umax V, Mach	1,000	100	32	$112,000 with 8M-byte memory, terminal, 505M-byte disk, tape, 2 CPUs
	Multimax 320 (2-20 CPUs)	June 1987	DP, SE	VAX 8800, IBM 4381	4-40	Up to 2 (S), up to 40 (P)	3,781 per CPU DH (actual), 2.16 per CPU LP (actual)	80	4-128	1.5-4	NA	15	Umax 4.2, Umax V, Mach	1,000	200	32	$143,000 with 8M-byte memory, terminal, 505M-byte disk, tape, 2 CPUs
Elxsi Ltd. (408) 942-0900	System 6400 (1-12 CPUs)	Dec. 1983	SE	VAX 8700, VAX 8800	12-144	4 (S), 6.7 (P)	9,549 DH (actual)	50	Up to 2G	2.4	128	8	EMBOS, EMS, Unix System V, Unix 4.2	1,000	100-300	64	$390,000 with 16M-byte memory, 1 474M-byte disk, power supplies, cabinet, tape
Flexible Computer Corp. (214) 929-6000	Flex/32 Multicomputer Series 600 (2-4 CPUs)	Aug. 1986	SE	VAX	6-12	0.8-1.2 (S), 2-4 (P)	NA	45-100	2-57.5	2.5	255	255	Unix System V, MMOS	255	20-30	32	$80,000
	Flex/32 Multicomputer Series 1200 (2-8 CPUs)	Aug. 1986	SE	VAX	12-24	1.2-2.4 (S), 4-8 (P)	NA	45-100	2-57.5	2.5	1,020	1,020	Unix System V, MMOS	1,020	50-60	32	$80,000
	Flex/32 Multicomputer Series 2000 (2-10 CPUs)	Jan. 1985	SE	VAX	24-30	2.4-3 (S), 8-10 (P)	NA	45-100	2-80	2.5	2,040	2,040	Unix System V, MMOS	2,040	70-80	32	$150,000
	Flex/32 Multicomputer Series 3000 (2-20 CPUs)	Feb. 1985	SE	VAX	30-60	3-6 (S), 10-20 (P)	NA	45-100	2-160	2.5	2,550	2,550	Unix System V, MMOS	2,550	90-100	32	$200,000
	Flex/32 Multicomputer Series 6000 (22-40 CPUs)	Nov. 1986	SE	VAX	60-120	6-12 (S), 20-40 (P)	NA	45-100	24-240	2.5	5,100	5,100	Unix System V, MMOS	5,100	100-120	32	$800,000
Gould Inc., Computer Systems Division (800) GOULD-10	Concept 32/67 series	June 1983	SE	VAX 11/782	3.262	0.166 (S)	0.166M LP (actual)	150	2-16	NA	256	16	MPX-32	256	128	32	$40,000
	Concept 32/97 series	March 1984	SE	VAX 8600	10.7	0.593 (S)	0.591M LP (actual)	75	4-16	NA	256	16	MPX-32	256	128	32	$200,000
	Powernode 60 series	Nov. 1984	SE	VAX 11/782	4.2	0.25 (S)	0.25M LP (actual)	150	2-16	NA	256	16	MPX-32	256	128	32	$40,000
	Powernode 90 series	Dec. 1984	SE	VAX 8600	13.5	0.91 (S)	0.94M LP (actual)	75	4-16	NA	256	16	MPX-32	256	128	32	$200,000
Harris Corp. Computer Systems Division (800) 4-HARRIS	MCX-5 Model 50	Feb. 1987	SE	Microvax	4.1	NA	4,444 DH (actual), 325K LP (actual), 392K LL (actual)	60	2-16	650K-2.4M	32	25	Unix System V with real-time extensions	32	2-16	32	$27,900 with CPU, 2M-byte memory, 650K-byte disk, power supply, two-user Unix license
	MCX-3 Model 60	Jan. 1986	SE, OA	VAX 8250	10.5	NA	11,332 DH (actual), 829K LP (actual), 1M LL (actual)	60	2-16	650K-2.4M	19	13	Unix System V with real-time extensions	32	2-16	32	$32,400 with CPU, 2M-byte memory, 650K-byte disk, two-user Unix license, power supply
	MCX-5 Model 60	Jan. 1986	DP, OA, SE	VAX 8350, 8550	10.5	NA	11,332 DH (actual), 829K LP (actual), 1M LL (actual)	60	4-16	650K-2.4M	64	24	Unix System V with real-time extensions	64	32	32	$39,800 with CPU, 4M-byte memory, 650K-byte disk, power supply, two-user Unix license
	HCX-5 Model 70	Jan. 1986	DP, SE	VAX 8800	17.2	NA	18,665 DH (actual), 1.365M LP (actual), 1.646M LL (actual)	60	4-32	650K-2.4M	96	40	Unix System V	96	64-100	32	$73,000 with 2 CPUs, 4M-byte memory, 650K-byte disk, 16-user Unix license, power supply
	HCX-5	July 1987	DP, SE, OA, TP	VAX 8530	5	0.28 (S), 0.52 (P)	4,948 DH (actual)	100	4-32	2.48	32	6	HCX/UX	32	16	32	$124,500 with 4M-byte memory, 32-user HCX/UX license, power supplies
	HCX-9	May 1987	DP, SE, OA, TP	VAX 8700	8	0.48 (S), 0.87 (P)	10,155 DH (actual)	100	4-128	2.48	256	40	HCX/UX	256	96	32	$195,500 with 4M-byte memory, 32-user HCX/UX license, power supplies
	HCX-7	June 1985	DP, SE, OA, TP	VAX 8650	7.5	0.48 (S), 0.87 (P)	10,155 DH (actual)	100	2-32	1.8	235	25	HCX/UX	235	96	32	$202,500 with 2M-byte memory, 32-user HCX/UX license, power supplies
	H60	June 1984	SE	NA	0.88	NA	NA	300	1.5-12	2.4	48	6	RT-VOS/MP, RT-VOS, VOS, VUE	48	NA	32-48	$48,000

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Harris Corp. Computer Systems Division (800) 4-HARRIS	H700	April 1983	SE	NA	0.88	NA	NA	300	12	2.4	128	31	RT-VOS/MP, RT-VOS, VOS, VUE	128	NA	32-48	$56,000
	H800	Aug. 1982	SE	NA	1.58	0.23 (S)	0.23M LP (actual)	150	12	2.4	128	31	RT-VOS/MP, RT-VOS, VOS, VUE	128	NA	32-48	$164,000
	H900	Aug. 1987	SE	NA	4.8	0.57 (S)	0.57M LP (actual)	75	12	2.4	96	18	RT-VOS/MP, RT-VOS, VOS, VUE	192	NA	32-96	$240,000
	H1000	Jan. 1984	SE	NA	4.8	0.57 (S)	0.57M LP (actual)	75	12	2.4	192	31	RT-VOS/MP, RT-VOS, VOS, VUE	192	NA	32-96	$250,000
	H1100	Aug. 1987	SE	NA	5	0.85 (S)	0.85 LP (actual)	75	12	2.4	96	19	RT-VOS/MP, RT-VOS, VOS, VUE	224	NA	32-96	$260,000
	H1200	June 1985	DP	NA	5	0.85 (S)	0.85M LP (actual)	75	12	2.4	224	31	RT-VOS/MP, RT-VOS, VOS, VUE	224	NA	32-96	$290,000
	H1500	Aug. 1987	SE	NA	10	1.70 (S)	1.70M LP (actual)	75	24	2.4	320	50	RT-VOS/MP, RT-VOS, VOS, VUE	320	NA	32-96	$555,000
	H1600	Sept. 1987	SE	NA	15	2.55 (S)	2.55M LP (actual)	75	36	2.4	416	69	RT-VOS/MP, RT-VOS, VOS, VUE	416	NA	32-96	$795,000
Hewlett-Packard Co. Contact local sales office	HP 3000 Series 58	1985	DP	IBM System/38	0.57*	NA	NA	105	4-8	1	152	5	MPE V	60	30-40	16	$75,000 with 4M-byte memory
	HP 3000 Series 70	April 1986	DP	IBM 4381 Model 11	1.7*	NA	NA	75	8-16	1	400	15	MPE V	NA	16	16	$150,000 with 8M-byte memory
	HP 3000 Series 930	1987	DP	VAX 8600, IBM 4381 Model 12	4.5	NA	NA	125	32-96	1	400	14	MPE XL	400	200	48	$186,500 with 16M-byte memory
	HP 3000 Series 950	Fourth quarter 1987	DP	VAX 8700, IBM 4381	7	NA	NA	73	32-128	1	NA	NA	MPE XL	NA	NA	48	$300,000
	HP 9000 Series 800 Model 840S	1986	SE	VAX 8600, 8530	4.5	NA	NA	125	8-96	1.2	128	NA	HP-UX	NA	16-50	32	$81,500 with 8M-byte memory, operating system
	HP 9000 Series 800 Model 850S	Fourth quarter 1987	SE	VAX 8550, 8700	7	NA	NA	NA	16-128	NA	NA	NA	HP-UX	90	50-80	NA	$200,000 with 16M-byte memory, operating system, power supply
Honeywell Bull, Inc. (800) 328-5111 ext. 99	DPS 7000 Model 10	First quarter 1988	DP, TP	IBM 9370 series	0.65*	NA	NA	150	2-16	1.8	4	4	GCOS 7	NA	15	32	$112,000 with CPU, 4M-byte memory, 4 ports, 700M-byte disk, tape
	DPS 7000 Model 20	Aug. 1987	DP, TP	IBM 9370 series	0.86*	NA	NA	150	2-16	1.8	4	4	GCOS 7	NA	30	32	$70,000 with CPU, 6M-byte memory, 4 ports, console
	DPS 7000 Model 30	Aug. 1987	DP, TP	IBM 9370 series	1.6*	NA	NA	150	2-16	1.8	4-8	4-8	GCOS 7	NA	80	32	$100,000 with CPU, 8M-byte memory, 4 ports, console
	DPS 7000 Model 40	Aug. 1987	DP, TP	IBM 9370 series	2.18*	NA	NA	150	2-16	1.8	4-8	4-8	GCOS 7	NA	150	32	$140,000 with CPU, 8M-byte memory, 4 ports, console
	DPS 7000 Model 50	Fourth quarter 1987	DP	IBM 9370 series	3.8*	NA	NA	150	2-16	1.8	4-8	4-8	GCOS 7	1,000	200	32	$193,200 with 2 CPUs, 8M-byte memory, 4 ports, console
	DPS 8/47	First quarter 1983	DP, TP	IBM 4381 Model 21	0.73*	NA	10 DC (estimate)	NA	8-64	1.2	10	25	GCOS 8	NA	115	36	$153,000 with CPU, 4M-byte memory, console
	DPS 8/49	First quarter 1983	DP, TP	IBM 4381 Model 22	1.1*	NA	17 DC (estimate)	NA	8-64	1.2	10	25	GCOS 8	NA	170	36	$235,000 with CPU, 4M-byte memory, console
	DPS 8/52	Second quarter 1980	DP, TP	IBM 4381 Model 22	1.1*	NA	17 DC (estimate)	NA	8-64	3	16	32	GCOS 8	NA	170	36	$450,000 with CPU, 8M-byte memory, console
	DPS 8/62	Second quarter 1980	DP, TP	IBM 4381 Model 22	1.2*	NA	21 DC (estimate)	NA	8-64	3	16	32	GCOS 8	NA	230	36	$550,000 with CPU, 8M-byte memory, console
	DPS 8/70	Second quarter 1980	DP, TP	IBM 4381 Model 23	1.8*	NA	27 DC (estimate)	NA	8-64	3	16	64	GCOS 8	NA	300	36	$700,000 with CPU, 8M-byte memory, console
IBM Contact local sales office	9373 Model 20	July 1987	DP, SE, OA, TP	NA	0.5*	NA	0.137M LP (actual)	90	4-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370	NA	20-50	32	$31,000 with 4M-byte memory
	9375 Model 40	Oct. 1987	DP, SE, OA, TP	NA	0.5*	NA	0.18M LP (actual)	90	8-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370	NA	NA	32	$65,000 with 8M-byte memory
	9375 Model 60	July 1987	DP, SE, OA, TP	NA	1.3*	NA	0.40M LP (actual)	90	8-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370, MVS/370	NA	NA	32	$93,000 with 8M-byte memory
	9377 Model 90	Oct. 1987	DP, SE, OA, TP	NA	2.6*	NA	0.78M LP (actual)	50	8-16	Up to 3	NA	NA	VM/SP, VM/IS, VSE/SP, IX/370, MVS/370	NA	NA	64	$90,000 with 8M-byte memory
	System/38 Model 100	1986	DP	NA	0.31*	NA	NA	133-400	2-4	2.5-3	4	NA	CPF	128 (local)	NA	48	$37,500 with 2M-byte memory, 64M-byte disk
	System/38 Model 200	1986	DP	NA	0.47*	NA	NA	NA	4-6	2.5-3	NA	NA	CPF	NA	NA	48	$62,500 with 4M-byte memory
	System/38 Model 300	1986	DP	NA	0.63*	NA	NA	NA	6-8	2.5-3	NA	NA	CPF	NA	NA	48	$107,500 with 6M-byte memory
	System/38 Model 400	1986	DP	NA	0.82*	NA	NA	NA	6-8	2.5-3	NA	NA	CPF	NA	NA	48	$142,500 with 6M-byte memory
	System/38 Model 600	1986	DP	NA	0.89*	NA	NA	NA	8-16	2.5-3	NA	NA	CPF	NA	NA	48	$182,500 with 8M-byte memory

VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
IBM Contact local sales office	System/38 Model 700	1986	DP	NA	1.2*	NA	NA	67-267	16-32	3	12	NA	CPF	256 (local)	NA	49	$252,500 with 16M-byte memory, 64M-byte disk
	4381 Model 11	1986	DP, SE, TP	NA	1.5*	NA	0.39M LP (actual)	68	4-16	3	NA	6-12	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$175,000 with 4M-byte memory, 4K-byte buffer, 6 channels
	4381 Model 12	1986	DP, SE, TP	NA	2.8*	NA	0.95M LP (actual)	68	8-32	3	NA	6-12	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$330,000
	4381 Model 13	1986	DP, SE, OA	NA	3.7*	NA	1.2M LP (actual)	56	8-32	3	NA	6-12	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$440,000
	4381 Model 14	1986	DP, SE, TP	NA	6.2*	NA	NA	56	16-32	3	NA	12-18	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$680,000
	4381 Model 21	First quarter 1988	DP, SE, TP	NA	2.2*	NA	NA	68	8-16	3	NA	6-12	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$225,000
	4381 Model 22	First quarter 1988	DP, SE, TP	NA	3.3*	NA	NA	68	16-32	3	NA	6-12	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$350,000
	4381 Model 23	First quarter 1988	DP, SE, TP	NA	4.8*	NA	NA	52	16-64	3	NA	6-12	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$530,000
	4381 Model 24	First quarter 1988	DP, SE, TP	NA	8.1*	NA	NA	52	16-64	3	NA	12-24	VM/XA, VM/SP, MVS/XA, MVS/SP, IX/370	NA	NA	32	$890,000
ICL Co. (061) 223-1301 (Manchester, England)	Series 39 Level 15	June 1987	DP, TP	System/38 Model 400, VAX 8250	1.4	NA	4.3 DC (estimate)	170	NA	2.4	NA	3[4]	VME	4,000	125	32	$54,000 with 8M-byte memory, content-addressable file store (CAFS)
	Series 39 Level 25	June 1987	DP, TP	System/38 Model 600, VAX 8350	1.8	NA	5.6 DC (estimate)	170	NA	3	NA	3[4]	VME	4,000	170	32	$82,000 with 8M-byte memory, CAFS
	Series 39 Level 35	June 1987	DP, TP	System/38 Model 700, VAX 8500	2.4	NA	7.4 DC (estimate)	170	NA	3	NA	3-6[4]	VME	4,000	220	32	$109,000 with 8M-byte memory, CAFS
	Series 39 Level 35D	Oct. 1987	DP, TP	IBM 4381 Model 12, VAX 8550	4.4	NA	14 DC (estimate)	170	NA	3	NA	3-5[4]	VME	4,000	400	32	$190,000 with 16M-byte memory, CAFS
	Series 39 Level 40	Oct. 1987	DP, TP	IBM 4381 Model 21, VAX 8530	2.1	NA	11 DC (estimate)	25	NA	3	NA	3[4]	VME	8,000	350	32	$302,000 with 8M-byte memory, CAFS
	Series 39 Level 50	Aug. 1986	DP, TP	IBM 4381 Model 12, VAX 8550	3	NA	16 DC (estimate)	25	16-32	3	NA	3-6[4]	VME	8,000	550	32	$536,000 with 16M-byte memory, CAFS
	Series 39 Level 50XP	Oct. 1987	DP, TP	IBM 4381 Model 23, VAX 8800	4.2	NA	22 DC (estimate)	25	NA	3	NA	3-6[4]	VME	8,000	750	32	$608,000 with 16M-byte memory, CAFS
MAI Basic Four, Inc. (714) 731-5100	MPX 8000 series	March 1983	DP, OA	VAX 8250, 8530, System/36, 38	NA	NA	NA	160	1-8	1.2	116	NA	BOSS/VS, BOSS/VS Multiuser	116	27	16-32	$40,500 with CPU, 2M-byte memory, 4 ports, 300M-byte disk
	MPX 9100 series	Nov. 1985	DP, OA, TP	VAX 8530, System/38	NA	NA	NA	160	4-12	1.2	116	NA	BOSS/VS	116	43	32	$87,999 with CPU, 4M-byte memory, 4 ports, 300M-byte disk, controller
	MPX series	Nov. 1985	DP, OA, TP	VAX 8600, IBM 4300, System/38	NA	NA	NA	160	4-12	1.2	255	NA	BOSS/VS	255	73	32	$114,950 with CPU, 4M-byte memory, 4 ports, 300M-byte disk, controller, 32K-byte cache
McDonnell Douglas Computer Systems Co. (714) 250-1000	M9200 series	1981	DP	System/38	NA	NA	NA	130	1-8	20M bit/sec.	208	3	Reality	208	48-80	32	$82,450 with 1M-byte memory, 130M-byte disk, 16 ports
	Series 18	1987	DP	IBM 4381, VAX 8500	NA	NA	NA	130	4-16	20M bit/sec.	400	4	Reality	400	NA	64	$395,000 with 4M-byte memory, 500M-byte disk, 64 ports
Modular Computer Systems, Inc. (305) 974-1380	Classic II/75	1982	DP	NA	1	NA	NA	125	1-4	NA	NA	32-64	MAX IV	256	NA	16	$86,600 with 1M-byte memory, console, power supplies
	Classic 32/87	1987	DP	NA	2.4	NA	NA	110	Up to 256	Up to 5	NA	32-64	MAX 32, MAX IV, Realix	256	NA	32	$148,500 with 64K-byte cache, 2M-byte memory, console, power supplies
National Advanced Systems Corp. (415) 962-6000	AS/VL 40	NA	DP, SE, TP	IBM 4381 Models 13, 14	5*	NA	NA	22	32-128	3-6	Up to 32	Up to 32	VM, MVS, DOS	NA	NA	32	$638,000 with 32M-byte memory, 8 channels
	AS/VL 50	NA	DP, SE, TP	IBM 4381 Models 13, 14	7.5*	NA	NA	22	32-128	3-6	Up to 32	Up to 32	VM, MVS, DOS	NA	NA	32	$891,000 with 32M-byte memory, 8 channels
	AS/VL 60	NA	DP, SE	IBM 4381 Models 13, 14	10*	NA	NA	22	32-128	3-6	Up to 32	Up to 32	MVS, VM, DOS	NA	NA	32	$1.27 million with 32M-byte memory, 8 channels
	AS/VL 80	NA	DP, SE, TP	IBM 3090 Model 150E, 4381 Model 14	17*	NA	NA	22	32-56	3-6	Up to 32	Up to 32	MVS, VM, DOS	NA	NA	32	$2.1 million with 32M-byte memory, 8 channels

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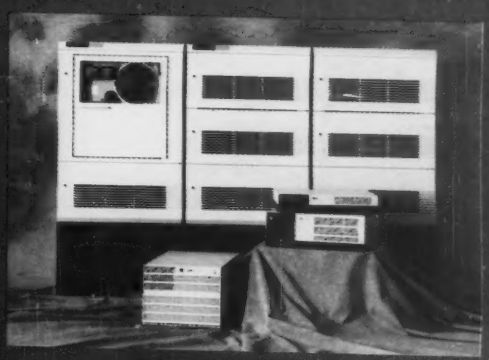

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VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
NCR Corp. Contact local sales office	9880 Extended Support Processor	NA	DP	NA	NA	NA	NA	230	NA	5M bit/sec.	48	NA	Tower operating system	32	20	32	$35,675 with 2M-byte memory, 85M-byte disk, tape
	Tower 32/800 (1-6 application processors)	1987	DP	IBM 9370, VAX 8300	8	NA	NA	NA	4-64	NA	128	NA	Unix	128	NA	32	$127,000 with 2 application processors, 8M-byte memory, 340M-byte disk, operating system
	9300 IP	1983	DP	NA	0.37	NA	NA	150	1-8	1.5	28	NA	ITX	240	NA	32	$36,000 with 1M-byte memory, 72M-byte disk, tape drive, operating system
	9400 IP	1984	DP	NA	0.67	NA	NA	150	1-8	1.5	240	NA	ITX	NA	NA	32	$62,000 with 2M-byte memory, 135M-byte disk, tape drive, operating system
	9500	1986	DP	NA	1.1	NA	NA	NA	2-16	1.5	432	NA	ITX DP	NA	NA	32	$119,500 with 2 CPU boards, 2M-byte memory, tape drive
	9811	NA	DP, TP	IBM 9370, 4381 series	1	NA	NA	145	4-16	1.5	11-16	11-16	VRX/E	NA	NA	32	$41,220 with 1 application processor, 4M-byte memory, 11 channels, console
	9821	NA	DP, TP	IBM 9370, 4381 series	2	NA	NA	145	8-32	1.5	16-32	16-32	VRX/E	NA	NA	32	$86,490 with 2 application processors, 12M-byte memory, 18 channels, console
	9822	NA	DP, TP	IBM 9370, 4381 series	2	NA	NA	145	8-32	1.5	22-36	22-36	VRX/E	NA	NA	32	$81,250 with 2 application processors, 8M-byte memory, 22 channels, dual consoles
	9832	NA	DP, TP	IBM 9370, 4381 series	3	NA	NA	145	12-48	1.5	29-50	29-50	VRX/E	NA	NA	32	$145,610 with 3 application processors, 20M-byte memory, 29 channels, dual consoles
	9842	NA	DP, TP	IBM 9370, 4381 series	4	NA	NA	145	16-64	1.5	36-64	36-64	VRX/E	NA	NA	32	$173, 160 with 4 application processors, 24M-byte memory, 36 channels, dual consoles
	9863	NA	DP, TP	IBM 9370, 4381 series	6	NA	NA	145	24-96	1.5	54-96	54-96	VRX/E	NA	NA	32	$256, 870 with 6 application processors, 36M-byte memory, 54 channels, dual console
	9864	NA	DP, TP	IBM 9370, 4381 series	8	NA	NA	145	32-128	1.5	72-128	72-128	VRX/E	NA	NA	32	$340,580 with 8 application processors, 48M-byte memory, 72 channels, dual consoles
Norsk Data NA (617) 366-4662	Norsk 500 series	1983	DP, SE	VAX 8600, 8800	7	NA	NA	120	4-200	2.1	250	4	Sintran	256	60	32	$90,000 with 128M-byte disk, 6M-byte memory
Point 4 Data Corp. (714) 259-9777	Mark 6	Feb. 1987	DP	System/36	5.9	NA	NA	170	2-16	1.2	129	NA	Iris	128	64	16	$35,000 with 2M-byte memory, 8 ports, 84M-byte disk, operating system
	Mark 12	Dec. 1985	DP	System/36	15.6	NA	NA	64	2-16	1.2	129	NA	Iris	128	96	16	$45,000 with 2M-byte memory, 8 ports, 84M-byte disk, operating system
Prime Computer, Inc. (800) 343-2540 (800) 322-2450 (Mass.)	Model 2755	Jan. 1987	DP, SE, OA, TP	VAX 8250, 8350, IBM 9370 Model 60	1.6	NA	NA	120	Up to 16	2.46	2	0	Primos	128	NA	32	$95,050 with central processor, 4M-byte memory, disk, operating system
	Model 9755	May 1986	DP, SE, OA, TP	VAX 8530, IBM 9370 Model 90	3.4	NA	NA	80	Up to 16	2.46	8	0	Primos	196	NA	32	$234,200 with 8M-byte memory, 496M-byte disk, operating system
	Model 9955 II	May 1986	DP, SE, OA, TP	VAX 8700, IBM 4381 Model 12	5	NA	NA	64	Up to 32	2.46	8	0	Primos	254	NA	32	$356,500 with 16M-byte memory, operating system, 496M-byte disk
	Model 6350	May 1987	DP, SE, OA, TP	VAX 8800, IBM 3090 Model 150E	11.8	NA	NA	44	Up to 32	2.46	8	0	Primos	254	NA	32	$549,000 with 32M-byte memory, 770M-byte disk, operating system
Pyramid Technology Corp. (415) 965-7200	Series 9000 9805	NA	DP, OA, TP	VAX 8530	2.5	0.27 (S)	4,800 DH (actual)	100	4-128	1.8-2.4	256	8	OSX	256	64	32	$128,000 with 4M-byte memory, 16 ports, 470M-byte disk, operating system
	Series 9000 9810	March 1987	DP, OA, TP	VAX 8700	7	0.50 (S)	9,800 DH (actual)	100	16-128	1.8-2.4	512	8	OSX	512	128	32	$210,000 with 16M-byte memory, 16 ports, 470M-byte disk, operating system
	Series 9000 9820	Feb. 1987	DP, OA, TP	VAX 8800	13	0.50 (S)	9800 DH (actual)	100	16-128	1.8-2.4	512	8	OSX	512	128	32	$309,000 with 16M-byte memory 32 ports, 470M-byte disk, operating system
	Series 9000 9830	NA	DP, OA, TP	VAX 8800	19	0.50 (S)	9800 DH (actual)	100	32-128	1.8-2.4	512	8	OSX	512	150	32	$424,000 with 32M-byte memory, 32 ports, 470M-byte disk, operating system
	Series 9000 9840	NA	DP, OA, TP	VAX 8974	25	0.50 (S)	9800 DH (actual)	100	32-128	1.8-2.4	512	8	OSX	512	256	32	$514,000 with 32M-byte memory, 32 ports, 470M-byte disk, operating system
Ridge Computer Co. (408) 986-8500	Ridge 3200	Nov. 1986	SE, TP	VAX 8650	Up to 6	NA	7,100 DH (actual), 0.51 LP (actual)	83	Up to 128	2.4	64	16	Unix System V	64	20	32	$43,000 with operating system, 8 ports, 6M-byte memory, 60M-byte tape
Sequent Computer Systems, Inc. (800) 854-0428	Balance 8B	Dec. 1984	DP, TP	VAX 8200, 8700	1.5-8.7	0.9 (S), 0.9 (P)	NA	NA	2-28	2.4	96	2	Dynix	96	32-48	32	$49,500 with 2 processors, 156M-byte disk, tape, 2M-byte memory
	Balance B21	Sept. 1986	DP, TP	VAX 8500, 8900	3.0-21	2.25 (S), 2.25 (P)	NA	NA	2-28	2.4	256	8	Dynix	256	64	32	$139,600 with 4 processors, 8M-byte memory, 306M-byte disk, tape
	Sequent S27 (2-10 CPUs)	Fourth quarter 1987	DP, SE	VAX 8600-8978	6-36*	0.72-3.6 (S)	5,400 (per CPU) DH (actual)	62.5	8-16 per CPU	3	96	2	Dynix	200	64	32	$89,500 with 2 CPUs, 8M-byte memory, 156M-byte disk, 18 ports, tape
	Sequent S81 (2-30 CPUs)	Third quarter 1987	DP, SE	VAX 8600-8978	6-108*	0.72-10.8 (S)	5,400 (per CPU) DH (actual)	62.5	8-240	3	256	8	Dynix	350	96	32	$164,000 with 2 CPUs, 8M-byte memory, 18 ports, 304M-byte disk, tape
Sequoia Systems, Inc. (800) 562-0011 (800) 245-4033 (in Mass.)	Series 100 (2-64 CPUs)	Oct. 1986	TP	IBM 3090, 3080	Up to 48	NA	10 (per 2 CPUs) DC (actual)	40	2G	1.86	Up to 96	Up to 12	Topix	1,000	300-500	32	$309,000 with 2 processors, 32M-byte memory
Stratus Computer, Inc. (617) 460-2192	FT-250	1982	TP	System/88	0.7*	NA	5 DC (actual)	125	4-64	1.2	256	14	VOS	1,022	30-500	32	$95,000 with 4M-byte memory, operating system, 302M-byte disk, 32 ports
	XA420	NA	TP	System/88	2*	NA	10 DC (actual)	125	4-64	1.2	256	14	VOS	1,022	30-500	32	$211,000 with 4M-byte memory, 302M-byte disk, operating system
	XA2000 series Models 110, 120, 130, 140	1987	TP	System/88	3-9*	NA	53 (Model 140) DC (actual)	62.5	4-64	1.2	256	14	VOS	1,022	30-500	32	$200,000-$1.1 million with 4M-byte memory, 302M-byte disk, 32 ports, operating system
Systems Concepts, Inc. (415) 984-1000	SC-20	April 1987	DP, SE	Decsystem-10, Decsystem-20	2	NA	NA	160	4.5-36	3	200	4	TOPS-10, TOPS-20	150-200	60-100	36	$200,000 with 4.5M-byte memory, 2 channels
	SC-30	Oct. 1985	DP	Decsystem-10, Decsystem-20	4	NA	NA	80	4.5-144	3	400	8	TOPS-10, TOPS-20	300-400	150	36	$500,000 with 18M-byte memory, 12M-byte disk

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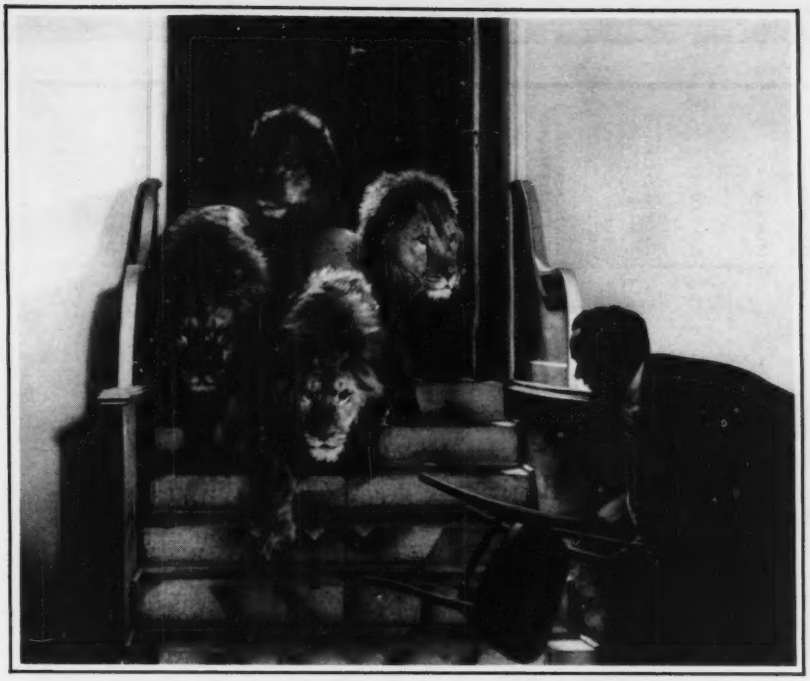

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VENDOR	PRODUCT	DATE FIRST INSTALLED	PRIMARY MARKET[1]	MOST COMPATIBLE IBM OR DEC SYSTEM	PERFORMANCE (MIPS)	PERFORMANCE (MFLOPS[2])	BENCHMARK[3]	MACHINE CYCLE TIME (NSEC)	MEMORY (MBYTES)	DISK TRANSFER RATE (MBYTES PER SECOND)	PORTS	CHANNELS	OPERATING SYSTEMS	MAXIMUM NUMBER OF USERS	TYPICAL NUMBER OF USERS	WORD LENGTH (BITS)	BASE PRICE
Tandem Computers, Inc. (408) 726-6000	Nonstop TXP (2-16 CPUs)	Oct. 1983	TP	IBM 4381	4-32	NA	9-72 DC (estimate)	83.3	16-256	1.2-5	NA	2-6	Guardian 90	NA	NA	32	$299,000 with 2 CPUs, 16M-byte memory, power supply
	Nonstop EXT25 (2-4 CPUs)	Aug. 1986	TP	IBM 4381 Model 21, 9377 Model 90	4-8	NA	9-18 DC (estimate)	83.3	16-64	1.2-5	NA	2-4	Guardian 90	NA	NA	32	$250,000 with 2 CPUs, 16M-byte memory, 512M-byte disk, power supplies
Texas Instruments, Inc. (800) 527-3500	System 1500 (1-4 CPUs)	Oct. 1986	DP	VAX 8200, 8300	2.5-10	NA	4,545 DH (actual)	180-480	2-20	1.81	6-21	NA	TI System V	128	96	32	$59,995 with 2M-byte memory, 140M-byte disk, 60M-byte tape, 8 ports, power supply
Tolerant Systems, Inc. (408) 433-5588	Eternity Series P200 (1-40 CPUs)	Dec. 1985	TP	System/88, VAX 8600	3-4 (per CPU)	NA	NA	NA	4-12	3	1-2 (per CPU)	1-2 (per CPU)	TX	200 (per CPU)	50-100 (per CPU)	32	$93,000 with CPU, 4M-byte memory, 336M-byte disk, tape, 12 ports, console
The Ultimate Corp. (201) 887-9222	Ultimate Model 6000	NA	DP	NA	NA	NA	NA	300	Up to 4	1.2	8	1	Ultimate Operating System	NA	NA	16	$35,300 with CPU, operating system, 512K-byte memory, 86M-byte disk, 7 ports
	Ultimate Model 7000	NA	DP	NA	NA	NA	NA	300	Up to 4	1.8	32	1	Ultimate Operating System	NA	NA	32	$310,000 with CPU, 4M-byte memory, 32 ports, 515M-byte disk, operating system
	Ultimate Model 3010	NA	DP	NA	NA	NA	NA	165	Up to 512K	1.21	7	1	Ultimate Operating System	NA	NA	16	$43,000 with CPU, 512K-byte memory, 227M-byte disk, 7 ports, operating system
	Ultimate Model 3020	NA	DP	NA	NA	NA	NA	165	1-2	1.21	15	1	Ultimate Operating System	NA	NA	16	$55,000 with operating system, CPU, 227M-byte disk, tape drive, 15 ports, 1M-byte memory
	Ultimate Model 3025	NA	DP	NA	NA	NA	NA	165	Up to 2	1.21	15	1	Ultimate Operating System	NA	NA	16	$69,000 with operating system, CPU, 15 ports, 2M-byte memory, 344M-byte disk
	Ultimate Model 3030	NA	DP	NA	NA	NA	NA	NA	2-4	NA	15	1	Ultimate Operating System	NA	NA	16	$81,000 with operating system, CPU, 15 ports, 2M-byte memory, 344M-byte disk
	Ultimate Model 3040	NA	DP	NA	NA	NA	NA	NA	2-4	NA	31	1	Ultimate Operating System	NA	NA	16	$112,000 with operating system, CPU, 31 ports, 2M-byte memory 510M-byte disk drive
Unisys Corp. (formerly Burroughs Corp.) (313) 972-7000	7000/30	Nov. 1986	DP, SE	VAX 8700, 8800	NA	NA	NA	100	4-32	1.25	100	NA	Unix System V.2	100	50	32	$74,500 with processor, cabinet, power supply
	7000/40	March 1985	DP	VAX 8700, 8800	7.7[a]	NA	NA	100	4-32	1.25	240	NA	Unix System V.2	240	120	32	$103,840 with processor, cabinet, power supply
	A 3	Sept. 1984	DP	System/38 Model 300	0.63[a]	NA	NA	NA	3-48	3	16[b]	NA	MCP/AS	NA	NA	48	$95,500 with 6M-byte memory, 125M-byte disk, console
	A 4	Sept. 1987	DP, TP	System/38 Model 400, VAX 8250	8	NA	NA	12-48	NA	3.4	NA	16	MCP/AS	NA	25-75	48	$55,000 with CPU, 12M-byte memory
	A 5F	Sept. 1986	DP	System/38 Model 700	1.4[a]	NA	NA	NA	6-24	3	NA	NA	MCP/AS	NA	NA	48	$224,000 with 6M-byte memory, 125M-byte disk, console
	A 6F	Dec. 1987	DP, TP	IBM 9370 Model 60, VAX 8350	1.6	NA	NA	12-48	NA	3.4	NA	24	MCP/AS	NA	50-200	48	$245,593 with CPU, 12M-byte memory
	A 10 DX	Sept. 1986	DP	IBM 4381 Model 12	2[a]	NA	NA	72.5	12-24	3	NA	40[b]	MCP/AS	NA	NA	48	$410,000 with 12M-byte memory
	A 10 FX	Sept. 1986	DP	IBM 4381 Model 13	2.9[a]	NA	NA	72.5	12-48	3	NA	40[b]	MCP/AS	NA	NA	48	$580,000 with 12M-byte memory
	A 10 HX	Sept. 1986	DP	IBM 4381 Model 14	5.3[a]	NA	NA	72.5	24-96	3	NA	80[b]	MCP/AS	NA	NA	48	$962,000 with 2 CPUs, 24M-byte memory
	V 310	June 1986	DP	IBM 9375 Model 60	0.91[a]	NA	NA	110	5-20	3	NA	32[b]	MCP/AS	NA	NA	40	$128,000 with 5M-byte memory
	V 340	Nov. 1985	DP, TP	IBM 4381 Model 11	1.36[a]	NA	NA	110	10-40	3	NA	32[b]	MCP/AS	NA	NA	40	$254,000 with 10M-byte memory
	V 380	Oct. 1985	DP, TP	IBM 4381 Model 12	2.18[a]	NA	NA	110	10-40	3	NA	64[b]	MCP/AS	NA	NA	40	$457,000 with 10M-byte memory
	V510	First quarter 1988	DP, TP	IBM 3090 Model 120E	4.5[a]	NA	NA	48	20-80	3	NA	64[b]	MCP/AS	NA	NA	40	$950,000 with 20M-byte memory
	V 530	Fourth quarter 1987	DP, TP	IBM 3090 Model 150E	8.37[a]	NA	NA	48	40-160	3	NA	64[b]	MCP/AS	NA	NA	40	$1,775,000 with 40M-byte memory
Unisys Corp. (formerly Sperry Corp.) (215) 542-4011	Series 80 Model 10	July 1987	DP	System/38 Model 300	1.05[a]	NA	NA	102	2-8	2.2	28	8	OS/3	NA	NA	32	$94,000 with 2M-byte memory
	Series 80 Model 20	July 1987	DP	System/38 Model 700	2.2[a]	NA	NA	102	4-16	2.2	28	8	OS/3	NA	NA	32	$178,920 with 4M-byte memory
	2200/201	Jan. 1987	DP	IBM 9375 Model 60	1.2	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$138,100 with 8M-byte memory, 2 170M-byte disks
	2200/202	Jan. 1987	DP	IBM 9377 Model 90	2.28[a]	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$218,290 with 8M-byte memory, 2 CPUs, 2 170M-byte disks
	2200/203	Second quarter 1987	DP	IBM 4381 Model 13	3.3[a]	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$327,850 with 3 CPUs, 8M-byte memory, 2 170M-byte disks
	2200/204	Second quarter 1987	DP	IBM 4381	4.2[a]	NA	NA	108	Up to 24	1.4	NA	NA	OS/1100	NA	NA	36	$400,450 with 4 CPUs, 8M-byte memory, 2 170M-byte disks
Wang Laboratories, Inc. (617) 459-5000	VS 7110	Jan. 1987	DP	NA	1.7[a]	NA	NA	240	4-16	1.8	255	10	VSOS	128	35-70	32	$90,000 with 4M-byte CPU, 32 ports
	VS 7120	Jan. 1987	DP	NA	2.3[a]	NA	NA	180	4-16	1.8	255	10	VSOS	128	50-100	32	$120,00 with 4M-byte CPU, 32 ports
	VS 7150	Jan. 1987	DP	NA	3.4[a]	NA	NA	120	4-16	1.8	255	10	VSOS	128	60-128	32	$160,000 with 4M-byte CPU, 32 ports
	VS 7310	Jan. 1987	DP	NA	3.4[a]	NA	NA	120	8-16	1.8	255	15	VSOS	192	100-180	32	$232,000 with 8M-byte CPU, 32 ports

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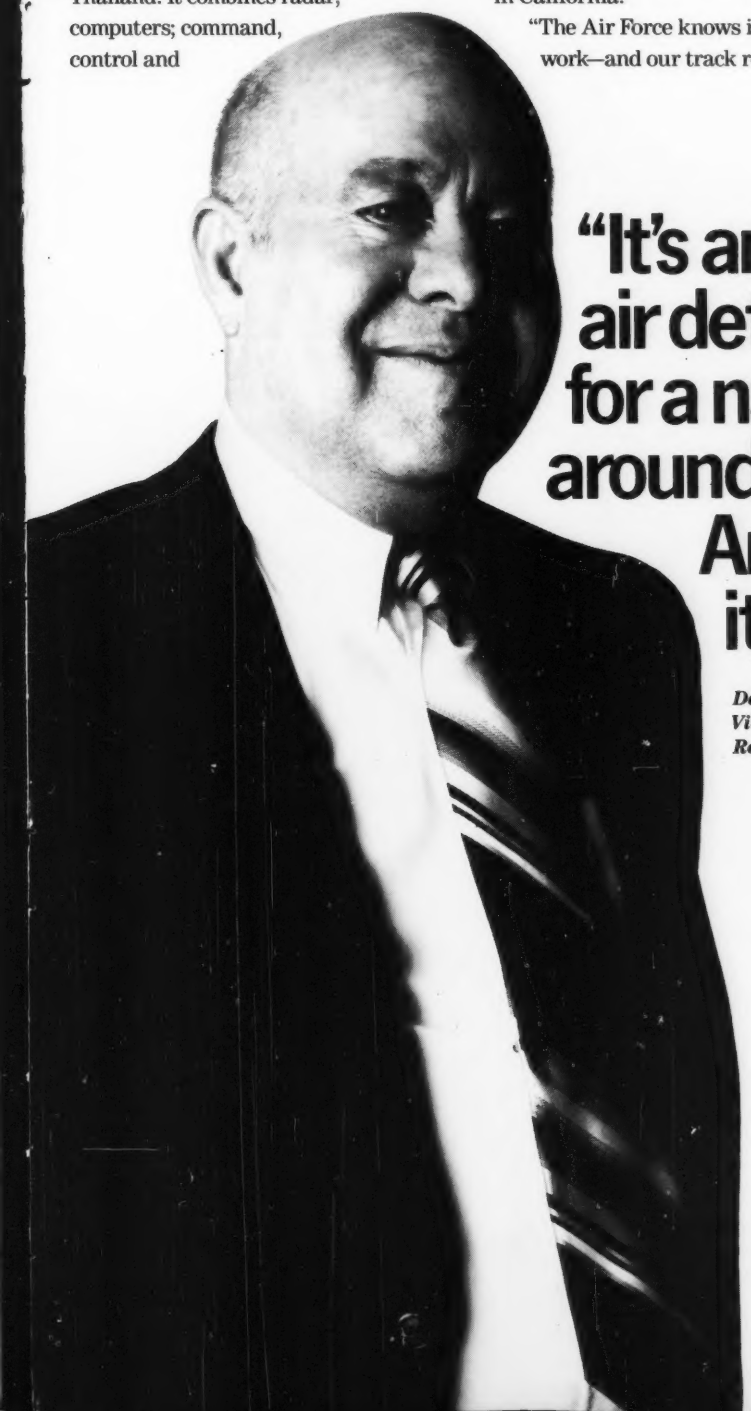

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COMPUTER CAREERS

Medical centers invest in MIS

Automation becoming critical as cost-cutting focuses on productivity

BY ROSE MULA
SPECIAL TO CW

Faced with rising health care costs, medical facilities are slashing expenses wherever possible. But MIS is one of the few segments of the health care industry receiving increased resources.

In this cost-conscious atmosphere, achieving savings through productivity is the key to survival for many hospitals, says Debby Schumann, MIS director of the Waltham-Weston Hospital & Medical Center in Waltham, Mass. "The opportunity to save money in a hospital by improving productivity is overwhelming," Schumann says. "And the way to improve productivity is through expanded computerization."

For that reason, says William Read, vice-president of MIS for the Geisinger Medical Center in Danville, Pa., MIS in the health care industry is enjoying a growth spurt.

More than saving money

Not only does automating existing manual processes result in dramatic savings, but installing new computer systems is the only feasible way to deal with the deluge of new reports required by Diagnostic Research Groups — Medicare regulations that determine payment and length of stay for specific illnesses.

"It would be expensive, impractical, even impossible to churn out manually all the necessary paperwork," Read says.

Besides automating manual systems, MIS departments in hospitals are implementing applications to provide additional support for patient services.

Funding up

"We're seeing a lot more funding than before; in fact, we're getting just about everything we ask for," says Chuck Karashin, associate director of development for North Carolina Memorial Hospital in Chapel Hill. "Now we're extending computerization to include health care services, and we're getting the funding we need to catch up."

As a result, he says, the picture for MIS professionals at North Carolina Memorial is rosy indeed. "In the last year, we filled a number of new positions, both in management and programming — which is extremely unusual for us," Karashin says.

He adds that he attributes this circumstance mainly to the hiring five years ago of a new director of operations, who assigned a high priority to upgrading the hospital's meager computer services.

"Prior to that time," Karashin says, "our Information Services Division was used only for financial data processing and to generate bills."

Such a practice is typical in most hospitals, Schumann says. "And you can't cut costs solely through efficient billing; it's the wrong focus."

Karashin also says that a number of hospitals throughout the country are starting to hire chief information officers, to whom the MIS director reports. "This is a new trend in the hospital setting," he says.

New reporting requirements are causing software vendors to develop new packages for the health care industry. They are also helping to foster the demand for programmers to modify off-the-shelf software and develop custom programs.

To support other departments, hospital MIS organizations are also seeking professionals who possess expertise in communications, or networking, as well as those with PC programming ability.

However, professionals with strong technical expertise who also have a thorough knowledge of health care procedures can write their own tickets, Karashin says.

"You have to understand an application before you can automate it," he adds.

Despite the increased demand for MIS professionals in health care, the opportunities are still not as plentiful as in other industries, according to Geisinger Medical Center's Read. Hospitals have not yet built up the complex internal information systems that their business counterparts have in place.

Yet in some respects, the health care environment is more satisfying than industry, he says. "You're actually involved in patient care, albeit indirectly," Read says. "That can be very gratifying. You get an emotional boost from knowing that what you're doing can have a beneficial effect on patients."

Professionals considering entering the health care field must decide whether the atmosphere balances the relatively low pay.

Historically, salaries for hospital support personnel have lagged behind those in industry because, traditionally, health care facilities operate on a nonprofit basis, Read says.

Bigger pay may be ahead

But he adds that he expects the pay imbalance to change as the complexion of health care changes and as small hospitals merge into groups that will share corporate data centers. "As the health care industry takes more of a business stance, salaries will begin to follow suit," Read says.

Because hospitals are nonprofit, they lack the competitiveness of private industry. But rising costs are causing them to become more business-oriented.

"Hospitals are extremely reluctant to pay the going rate for MIS people," Schumann says.

However, she adds, there are advantages to accepting the lower salaries and fewer benefits of the health care industry. "Professionals who can establish themselves and stick through the shakeout will be the golden boys and girls of tomorrow," Schumann says.

The best parts of the country for MIS health care professionals are places where hospitals compete against each other in close proximity. Two areas that offer potential opportunities are the Northeast, especially Boston, and Florida, because of the high elderly population who require frequent hospitalization.

Mula is a Waltham, Mass.-based freelance writer.

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Network World is the news and features weekly for larger users of communications and networking. Its 220,000 readers (including subscribers and pass-along readers) include voice and data communications managers and specialists as well as communications consultants.

Digital News is a biweekly newspaper for computer professionals who work with the VAX line of computers from Digital Equipment Corporation. Total readership, including subscribers and pass-along readers, is over 210,000, including computer executives and managers, systems analysts, programmers, engineering executives and staff, and other VAX-oriented computer professionals.

Federal Computer Week is edited for information systems executives and staff who work in and sell to the federal government. Its weekly circulation includes MIS executives and managers, as well as systems analysts, programmers, software developers, communications specialists and other information systems professionals. Total readership (including paid and pass-along) exceeds 120,000.

Computer Currents is a group of regional publications edited to meet the needs of business and professional users of personal computers in the region covered.

Computer Currents/Northern California Edition is published biweekly and has a total circulation of 75,000. Total readership exceeds 225,000.

Computer Currents/Southern California Edition is published monthly and has a total circulation of 78,000, with a total readership of 234,000.

Computer Currents/Boston Edition covers the entire eastern Massachusetts and southern New Hampshire area with a monthly circulation of 40,000 and total readership of 120,000.

To put the IDG Communications Computer Careers Network to work for you, call the sales office nearest you — or contact John Corrigan, Recruitment Advertising Sales Director, at 617-879-0700. Just one quick phone call can give you all the information you need on running your recruitment advertising — regionally or nationally — in up to eight leading industry newspapers.

Now you can recruit the right people in the right places at the right price.

Let us introduce you to the IDG Communications Computer Careers Network. It's the new advertising service that lets you run the most targeted and cost-efficient recruitment program possible.

Its many options help you recruit qualified computer and communications professionals - regionally or nationally - with combination buys of up to eight leading newspapers. And all together, the Computer Careers Network delivers your message to an audience of well over 2 million qualified computer professionals.

Look at what the Computer Careers Network lets you do:

Customize your recruitment program. The Networks' eight newspapers - *Computerworld, InfoWorld, Network World, Digital News, Federal Computer Week,* and *Computer Careers*/Northern California, Southern California, and Boston editions - let you tailor your recruitment program to your specific needs. You can buy the basic package of three - or as many as eight with add-on options. That way you can recruit from the combination of computer and communications professionals that's best for you.

Target your ad placement. You can place your advertising exactly where you want. If you wish to recruit within a specific area, you can advertise in the regional editions of the newspapers you choose - East, West, or Midwest. Or you can extend your reach by running in two regions - or even nationally. Plus - you can still take advantage of stand-alone national rates for individual newspapers.

Reach qualified professionals cost efficiently. Gone are the days when you have to worry about paying for waste circulation. The Computer Careers Network lets you buy the combination of newspapers that will deliver your recruitment message to qualified computer and communications professionals - and only those qualified professionals you need to reach.

To put the new Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you, or contact **John Corrigan**, Recruitment Advertising Sales Director, at 617-879-0700 ext 676.

One quick phone call can give you all the information you need on running your recruitment advertising in up to eight leading industry newspapers. And if you hurry, you can still get in on the special low introductory offer!

PROGRAMMER/ANALYSTS (Experienced)

VICTORIA'S SECRET STORES, the fastest growing division of the Columbus, Ohio based LIMITED, INC., is adding several positions for experienced Programmer/Analysts. If you are looking for a progressive, fast-paced work environment, we have the opportunity for you!

We seek individuals with 2 or more years of programming experience with application design skills. Our environment is:

- **IBM 3090**
- **COBOL Batch/Online**
- **IDMS Database Management Systems**
- **CICS**
- **TSO/SPF**

Previous retail experience in Merchandising systems is a plus and a college degree is required. Additionally, Systems 38 applications development experience is helpful.

Victoria's Secret Stores is the leading intimate apparel retailer in the nation with 210 stores across the country. We will double in size over the next 2 years providing tremendous opportunities for career growth for our associates! If you would like to become a part of our MIS team, please send resume to: **VICTORIA'S SECRET STORES, Personnel Department–TLB, P.O. Box 16586, Columbus, Ohio 43216.** NO PHONE CALLS, PLEASE.

VICTORIA'S SECRET STORES

An Equal Opportunity Employer

TECHNICAL SUPPORT SUPERVISOR
Management Information Supervisor 6
State of Wisconsin

Wisconsin Department of Natural Resources (DNR), Bureau of Information Management, Madison. Starting salary between $33,876 and $41,244 or more annually depending on qualifications. The DNR is purchasing a new computer network which may be IBM, Data General, Digital Equipment Corp. (DEC), or a combination of vendors. Manage the Technical Support Unit in planning, implemention and monitoring the DNR's Computer Center and network to include supervision of the Software Services, Hardware/Network Support, and Systems Management. Contact Jackie Layman (608) 266-9236, Wisconsin Dept. of Natural Resources, PO Box 7921, Madison, WI 53707 for Special Application and Examination materials. Applications will be accepted until the needs of the service are met.

An Equal Opportunity Employer functioning under an Affirmative Action Plan

COMMUNICATIONS SYSTEMS PROGRAMMER

A new position has been created recognizing Wheel Horse Products' expanding telecommunication needs. The successful candidate will develop improvements in telecommunications to areas within and outside the company, install and maintain communication systems, and train others in the use of these systems. To qualify for this position, candidates must possess a B.S. in Computer Science or Business with experience in DOS/CICS systems programming, SNA/SDLC communication networks, and PC-to-PC and PC to mainframe communications. DOS/VSE and VM systems programming and E-Mail/BBS experience is desirable. Current system is 4381 and 4Phase minicomputers. We offer a highly competitive salary and excellent employee benefits. For confidential interview, send resume and salary requirements to:

WHEEL HORSE PRODUCTS, INC.
Attn: Salaried Personnel
515 West Ireland Rd.
South Bend, IN 46614
Equal Opportunity Employer

DP TRAINER/ USER CONSULTANT
Info Center Environment, Chicago, IL

Familiar with mainframe and/or micro software in an IBM environment. Must develop and deliver courses for DP staff and End Users and provide support as needed. Good people skills and programming background desirable.

Send resume to:

Frank Volante
The Peoples Gas Light and Coke Co.
122 So Michigan Avenue
Chicago, IL 60603

DATA CENTER MANAGER

Manager needed for financial institution data center in east Texas. Convenience of a small community, but with access to Houston and Dallas. Nine member staff using modified Florida Software on a Burroughs 4955 to provide on-line service to 15 offices statewide. Also supports two ATM's and several IBM PC's. COBOL programming experience a necessity. Resumes to:

Home Savings and Loan
Attn: Personnel
5036 Champions
Lufkin, TX 75901

Interested In Reaching Mid West Coast Professionals?

The computer professionals who aren't actively looking can be the ones you most want - - "The Stars" who are successful in their jobs. You won't find them in the Sunday classified, because they aren't actively looking. But you will find them in the recruitment pages of Computerworld, which 83% of our readers say they read regularly.

Computerworld's Midwest Regional edition reaches nearly 230,000 computer industry professionals. And Computerworld reaches more than half of all MIS/DP professionals in that region.

For more information about our new regional pages and special rates call, Katie Kress, Mid West Recruitment Manager or Ellen Casey, Account Executive at 800-343-6474 or in Mass call 617-879-0700.

CP&L: Where The Right Environments Come Together

Immediate Opportunities In Applications Development

Consider what you want from your career and then picture an ideal lifestyle. If you could have the right environment for both, your next career move would be an easy one. With CAROLINA POWER & LIGHT COMPANY, a major force in Southeastern power generation and distribution, the personal and professional environments come together to provide an excellent base for long-term satisfaction.

Let's examine our state-of-the-art technological environment first. Along with wide use of personal computers, we're operating two IBM 3090-200's, one IBM 3083J, one Amdahl 5860, and one Amdahl 5870. The CICS on-line environment has been growing at the rate of 75-100% per year. This year, we have expanded to a new Data Center. We're operating under MVS/XA and VM/CMS utilizing an SNA/SDLC network consisting of over 2,000 terminals and printers. Our programming languages are COBOL, DATACOM's IDEAL, SAS and Fortran. We have a growing Information Center environment and are aggressively pursuing end-user computing and office automation technologies.

Now, about personal lifestyle. With CP&L in the beautiful Carolinas, your leisure time can take place in the mountains or on the seashore—or in many great areas in between. Year-round, we enjoy a mild but seasonal climate and a wide variety of recreational and cultural events. The area has a moderate cost-of-living, excellent schools and fine housing.

We have recently completed a large strategic planning study and have a significant backlog of technical and application development projects. We are transitioning from a largely maintenance mode to an aggressive development mode. We are seeking talented individuals for the following:

APPLICATIONS DEVELOPMENT

- **Programmers**
  2-5 years structured coding experience in a development environment versus a maintenance environment. Highly desired experience would include: DATACOM; COBOL; IDEAL; CICS.
- **Systems Analysts**
  5-plus years experience in a development environment versus a maintenance environment. Highly desired experience would include: Structured analysis techniques; Relational Data Modeling; DATACOM/DB; On-line real-time systems; Arthur Andersen's Method/1; Prototyping; Application Generators.

CP&L offers competitive salaries, excellent benefits, and opportunities to advance. If interested in becoming part of our important team of professionals, send resume with salary requirements to: **Susie Brown, Recruitment Representative, Dept. CW9/21, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, NC 27602.** An Equal Opportunity/Affirmative Action Employer.

CP&L

Carolina Power & Light Company
Energy In Operation

Anatec

"Our people...are Anatec's most important asset."

Al Schornberg
Chief Executive Officer

If you're the best, you deserve the best.

It takes talent, commitment and hard work to become a top-notch computer professional. And that kind of effort should be rewarded. At least that's the way we see things at Anatec, one of the world's fastest growing professional software services companies.

Of course, that may be because Anatec was founded by people who understand computers and computer people. We know what it takes to make our employees happy and we make sure they get it. We even throw in extras like paid overtime, 100% tuition reimbursement, a top of the line profit sharing plan and a retirement program.

Right now, we're looking for:

Programmers • Programmer Analysts
Systems Analysts • Team Leaders
Systems Programmers • DBAs

To qualify, you need skills in:

IMS • INGRES • DB2 • CICS

If you're a DP professional with high performance standards and 2+ years' experience, bring your skills to a company that understands you. For more information on positions available in our various locations, call us at (313) 540-4440 or send your resume to:

Analytical Technologies, Inc.
30300 Telegraph Rd., Suite 184
Birmingham, MI 48010

Equal Opportunity Employer

NEW ENGLAND

BOSTON
IDMS/COBOL P/A's
Several talented tech. contributors needed by fast-paced BOSTON fin'l. svcs. org. IBM 309X OS/MVS COBOL, IDMS ADS/O environ. w/on-line develop. apps. projs. Outstanding mix of technical, analytical & user comm. skills. Salaries to $38,000.

BOSTON
PROJ. MGR.
HP3000 - Nat'ly. known SUBURBAN hi-tech firm seeks proven Proj. Mgr. to supv. fin'l. apps. team. Must have ASK fin'l. pkg. exp. on H-P or VAX sys. Oppty. to play key hi-vis. role in expand. MIS dept. Salary $45,000.

BOSTON
SR. VM SYS. PROG.
Large SUBURBAN fin'l. svcs. firm seeks Sr. VM Sys. Prog. to assist in migration to MVS/XA. Must have hvy. VM + DOS/VSE exp. pref. Oppty. to be a ldr. in attract. MIS org. as it upgrades for future growth. Salary to $40,000+.

HARTFORD
MVS SYSTEMS PROGRAMMER
SUBURBAN oppty. for MVS sys. prog. w/min. 2 yrs. exp. Oppty. to be involved w/perf., capacity planning & VTAM, SNA install's. Excellent growth potential for indiv. seeking a tech. challenging position. Salary $34,000 to $43,000.

HARTFORD
IDMS
3+ yrs. COBOL/IDMS w/fin'l. ins or mfg. bkgrd. qualifies for oppty's. w/clients throughout New England. Salaries to $35,000.

HARTFORD
DB 2 CONS
1+ yrs'. exp. in DB2 plus extensive IMS/MVS tech. bkgrd. qualifies for area oppty. to provide tech. guidance/training to blue chip clients! Excellent oppty. to "do your thing!" Salary to $45,000.

ROBERT HALF
DATA PROCESSING
PERSONNEL SPECIALISTS
Contact the Manager of either office listed below.
100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
Client Companies Assume All Fees.

DATA BASE ANALYST

We are a progressive, investor-owned electric and gas utility serving DE, MD, and VA. Due to significant growth in the number of our systems using ADABAS, a new position has been created in our Information Systems Department. Position requires at least 2 years experience in data base administration using ADABAS in an MVS/XA environment. A college degree is preferred. Responsibilities include administering and maintaining the corporate data base software to support multiple integrated business systems. Excellent growth opportunity, salary, and benefits. Send resume with salary history, to Personnel Department, P.O. Box 231, Wilmington, DE 19899.

DELMARVA POWER
Equal Opportunity Employer

Computer Programming, Systems & Engineering Professionals

Through our screened & selected affiliates, we'll get your resume to employers with applicable job openings in your targeted geographic areas. ***Openings for systems software & applications programmers & analysts & HW/SW engineers.*** No fee, contract or obligation. At least two years experience required. U.S. citizens & permanent residents only. Send resume to:

NATIONAL CONTACT NETWORK, INC.
Ref. CW, 3100 W. Chapel Ave.
Cherry Hill, NJ 08002
(609) 667-4080

If you are seeking career advancement in dp, talk to us! We are former computer professionals who have counselled and placed hundreds of professionals like yourself during the 17 years since our founding. We now have hundreds of new openings. Send your resume or call today! 400 Perimeter Ctr. Ter., #650, Atlanta, GA 30346, (404) 392-4242; or 12720 Hillcrest, #520, Dallas, TX 75230, (214) 661-8600.

DataPro

ATLANTA DALLAS dp

MAINE - N.H.

We have specialized in data processing professional placement in Maine & N.H. for a fifth of a century. If you qualify for positions in the $25-50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.
Att: Dept. 2
P.O. Box 7040 DTS
Portland, Maine 04112
(207) 773-4749

COMMUNICATIONS SOFTWARE ANALYST

Position supports GEMCOS, COMS and NDLII on a Burroughs A-Series mainframe. Also acts as project manager for application systems written in COBOL. Req's 2 years of progressive exp. in data communications on an A-Series system; 3 years in programming with 1 year as a Programmer/Analyst. We offer competitive salaries and benefit program. Send resume and salary history to:

Human Resources
John C. Lincoln Hospital
9211 North 2nd St
Phoenix, AZ 85020
Call collect (602) 870-6318
EOE

SYSTEM PROGRAMMER

Broward Community College is seeking a qualified System Programmer with a minimum of four years related experience and strong knowledge in VM, DOS, VSE, CICS, NCP and VTAM.

Salary range: $31,000 - $39,000.

Resumes must be received by October 9, 1987 at Broward Community College, Human Resources Management Department, 225 E. Las Olas Blvd., Ft. Lauderdale, FL 33301.

An Equal Access/
Equal Opportunity Institution.

VERMONT
& Rural Northern New England

- DATA BASE ADMINISTRATOR
- PROGRAMMER/ANALYSTS
- SYSTEMS ANALYSTS
- PROJECT LEADERS
- SYSTEMS PROGRAMMERS

3-5 years Manufacturing, Insurance or Banking experience & IBM 43XX DOS/VSE, 30XX OS/MVS, COBOL, BAL, BASIC, CICS, IDMS, S/36 RPGII, S/38 RPGII; HP3000, DEC; Datacomm, Lifecomm, Vantage. Fee paid. Salaries $18 to 45K plus relocation assistance. Please send resume in confidence to:

EDP PLACEMENT ASSOCIATES

WESTERN NORTH CAROLINA

JH Heafner Company, a major distribution company is seeking qualified individuals for immediate openings in our MIS division.

Programmer Analyst
We are seeking an individual with 3 or more years working knowledge of Honeywell L/64-DPS 7 GCOS, TDS and COBOL.

Programmer
Minimum of 2 years Structured Cobol Coding experience in a development environment.

JH Heafner offers competitive salaries, excellent benefits and opportunities to advance. If interested in becoming a part of our team of professionals, send resume with salary requirements to:

JH Heafner Co., PO Box 837, Lincolnton, NC 28093, Attn: Personnel Dept.

CAD Software Development Engineer: Develop 3-dimensional designing systems Computer Aided Design (CAD) software for apparel, footwear & furniture design, using Unix Operating System, "C", and Intel-8086 programming language. Research & Development in Computer Aided Manufacture (CAM). 8:30-12:30, 2:00-6:00 40 hr/wk. $26,500/yr. B.S. in E.E. or Computer Science required. Job site Grand Rapids, MI. Send resume to Job #42887, 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202 before Oct. 7.

Synergy

It's a beautiful system and it works.

When each crew member pushes past the limits towards their best performance, it's their combined energy that catapults the team to the winner's circle. NAS bases its winning strategy on the synergistic combination of excellent technology, top-rated service, and a growing matrix of partnerships. Our business alliances stem from a worldwide network of branch offices where we work in a partnership to serve major business, commercial, engineering and scientific corporations with IBM compatible mainframes and storage solutions. The success of our strategy has created dynamic growth and excellent opportunities for top professionals.

As a Marketing Representative or Systems Engineer at National Advanced Systems, you'll find a flexible marketing structure which allows us to be responsive to our customer's needs; and an outstanding support network which frees you to reach for your best performance. The result is positive synergy — the creative accomplishments of many individuals at NAS produce the most advanced technology and the greatest total value in customer service and support.

Marketing Representatives

You will develop strategies and contact prospective customers, while servicing established accounts. Our ideal candidate will have 2-4 years' sales experience which relates to the IBM compatible environment. You should also be an energetic individual who enjoys independence and teamwork.

Marketing opportunities are available in ***Atlanta, Boston, Chicago, Cincinnati, Denver, Detroit, Itasca (IL), Houston, Long Beach, Nashville/Memphis, Philadelphia, St. Louis, Stamford, Syracuse and in the state of New Jersey.***

Systems Engineers

Your major focus will be to provide technical support for marketing activities, working closely with prospects and customers. To qualify you should have at least 5 years of data processing industry experience in an IBM 4300, 308X, 3090 or large-scale IBM compatible environment.

We also require a BS degree in a related technical field or equivalent and externals/internals knowledge of one or more of the following: MVS/370, MVS/XA, VM/SP, DOS/VSE or any applicable subsystems.

Technical support opportunities are ***available in Amarillo, Atlanta, Baltimore, Cincinnati/Louisville, Dallas, Detroit, Minneapolis, New York City, Phoenix, St. Louis, San Francisco, Seattle, and Washington, D.C.***

Why try to beat a beautiful system? Synergy works at NAS and it can work for you too. If you're qualified and interested in working in the markets listed above, we'd like you to call us at:

(408) 970-1054
(For Western States)
or
(617) 964-9060
(For Eastern States)

If unable to call during business hours, please forward your resume in confidence to: ***National Advanced Systems, Dept. CW4, MS32-66, 750 Central Expressway, Santa Clara, CA 95051*** *(For Western States).* ***Or Two Newton Executive Park, Third Floor, Newton, MA 02162*** *(For Eastern States). We are an equal opportunity employer.*

National Advanced Systems

Experts In The Art Of Customer Satisfaction

Computer Careers

Growth
Charter Medical is one of the world's leading providers of psychiatric services. Today, we are international in scope with 83 hospitals and plans for continued aggressive expansion.

Opportunities
Our Charter Medical Information Services Department (CMIS) is a vital part of our corporate staff. This group of professionals is challenged with the management of existing systems, as well as the development of new projects designed to support our corporate, strategic goals. Current opportunities include:

- **Director, Application Products, End User Support (PCs + Intellect)**
- **Sr. Systems Manager, Operations (Data Center)**
- **Data Base Administrator (Distributed, PC, WANG, Mainframe)**
- **Sr. Systems Analyst**
- **Sr. Programmer Analyst**
- **Technical Consultant**
- **Hospital Systems Consulting (Travel Required)**

We are looking for individuals whose background and experience is compatible with our IBM 3083 mainframe environment operating under MVS/XA using COBOL, on-line language of CICS, batch JCL with TSO/ISPF editor, and/or WANG/VS, IBM PCs, FOCUS. Healthcare applications a real plus.

Lifestyle
In Macon, GA, you can enjoy art, culture, and tradition in a community free from traffic hassles and big city stresses.

Benefits
Charter Medical is a company whose proven success can give you stability, advancement and a full line of excellent benefits including medical, life and disability insurance, 401K retirement plan, employee stock purchase plan, tuition reimbursement, relocation assistance and supported country club and health memberships. For immediate consideration, please send a resume with salary history, in confidence to:

CHARTER MEDICAL CORPORATION

Charter Medical Corporation
Attn: Ernie Hawkins,
Dept. CW097-1
577 Mulberry Street,
P.O. Box 209,
Macon, GA 31298

An Equal Opportunity Employer

NETWORK PROFESSIONALS

Phoenix

Honeywell Bull is the first truly transnational computer company, an unparalleled venture of Companie des Machines Bull of France, NEC Corporation of Japan, and Honeywell Information Systems. A company with new ideas, new energy and direct access to the leading edge technology of Europe and the Far East, as well as America.

Our Customer Service Division is bringing those new ideas and new energies to the task of providing customer service to one of the industry's largest installed customer bases—10,000 strong. Honeywell Bull CSD is also the established national service provider for over fifty U.S. and foreign computer manufacturers.

We are dedicated to providing state-of-the-art cost efficient solutions to our customers' service requirements.

We seek qualified, self-motivated network professionals with a Bachelor's degree or equivalent in Electrical Engineering or Computer Science, and 3+ years experience with DDP, strong data communications background, including knowledge of SNA or OSI network standards, WAN or LAN, a customer satisfaction orientation, excellent communication skills and an ability to participate directly in consulting projects with clients to join our National Network Center of Expertise in Phoenix, AZ. The following positions are currently open as part of our long-range staffing plan:

- **Network Design Engineers**
- **Network Planning Consultants**
- **Network Support Analysts**
- **Telecommunications Consultants**

Honeywell Bull offers a competitive salary and comprehensive benefits package in a professionally challenging environment.

For prompt consideration, please forward your resume to the attention of David Barriga, Honeywell Bull, MS S46, 2626 W. Beryl Avenue, Phoenix, AZ 85021-1669.

Honeywell Bull

Customers are more important than computers.

DATA PROCESSING

Advanced Systems Division

DATA BASE ADMINISTRATORS

Call Ellen Cane Collect at (714) 250-0437 to Arrange an Interview

Northrop Advanced Systems Division in Pico Rivera, Southern California, is searching for a data processing professional to work with the most sophisticated DB2 systems in the business. And since we're listed in *The 100 Best Companies To Work For In America*[1], you'll work with the most advanced technology in the most advanced environment. So if you're a data processing professional, call Ellen if you can meet the challenges of this position.

You will perform data analysis, modeling and normalization activities in support of a three-schema, data driven approach to application systems development. You will also develop logical and physical data structures, supervise test and production data base maintenance and support activities, provide data base performance analysis and tuning activities. Develop data base related standards and procedures.

Senior level and specialist level positions are available for individuals with at least 8 years data processing experience including IMS DB/DC applications analysis and programming, and 3-5 years recent background as a Data Base Analyst or Administrator in an IMS DB/DC and DB2 environment. Background including Manufacturing, Engineering and/or Logistics applications preferred.

If unable to call, please send your resume including salary history to: Steven Martin, NORTHROP ADVANCED SYSTEMS DIVISION, Employment Office, Dept. CW2524, P.O. Box 1138, Pico Rivera, CA 90660-9977. Northrop provides its employees with a competitive, comprehensive benefits package.

MODEM USERS: You can access a complete listing of career positions now available with your home computer and a modem. Dial **(612) 941-5723** and enter the password "Career Access" for 24-hour information. ***Bit settings: data 8, stops 1, no parity, full duplex 300/1200 baud, enter password (Career Access), (CR) upon entry.***

CAREER ACCESS

U.S. CITIZENSHIP REQUIRED. Northrop is an Equal Opportunity Employer M/F/H/V.

[1]Levering, Moskowitz and Katz; *The 100 Best Companies To Work For In America.* © 1987, by New American Library, reprinted by arrangements with Addison-Wesley Pub. Co. Inc., Reading, MA 01867.

NORTHROP

Advanced Systems Division

THE SYSTEMS CHALLENGE

NEW positions have been created in response to NEW DEVELOPMENT and EXPANSION within the Group Health Systems area.

Positions at our Louisville headquarters offer multiple opportunities. Our IBM 3090/3084, MVS/XA, CICS, IDMS shop with over 90 software products and design aids provide the latest in data processing technology. Excellent benefits and compensation are offered. We are currently seeking qualified candidates who have a Bachelor's Degree and 2-5 years experience with IBM 30XX's, COBOL, JCL, VSAM. Some positions require IDMS, ADS-O, CICS.

Your future is at ***HUMANA!*** *We offer competitive salaries and benefits including tuition reimbursement, life, health and dental insurances, a fitness center and an excellent work environment.*

For consideration, please forward a resume with salary history to: ***R.M. Schreck, Humana Inc., 500 West Main Street, Louisville, Kentucky 40201-1438.*** *EOE/M/F.*

Humana

No Agencies Please.

Systems Programmers Systems Software Designers

(Printing & Publishing Applications)

Our Composed Output Applications Division, which is dedicated to providing leading edge services to the systems integrated Printing/Publishing industry, has several career opportunities.

We are currently looking for Systems Software Designers with experience in one or more of the following:

- SGML
- INTERLEAF
- Government Electronic Printing/-Publishing Development
- CCITT 3&4 Graphics Compression
- Integrated Publishing Software Development
- Systems Software Architecture
- IBM Assembler Language

We offer an excellent salary/benefits package with progressive career advancement opportunities. Send your resume to: AUXTON COMPUTER ENTERPRISES, INC., Dept. CW-921, 851 Trafalgar Crt., Maitland, FL 32751. An Equal Opportunity Employer.

AUXCO

Computer

SENIOR P/A PAID OVERTIME

Analysts International Corporation is currently hiring professionals with experience in the following:

- **IBM/COBOL/IMS DB/DC or IDMS/ADSO**
- **IBM/FOCUS/COBOL**
- **DEC VAX/COBOL**
- **IBM/ADABAS/NATURAL**
- **IBM/COBOL/CICS**
- **IBM/BAL/LIFECOMM**
- **HONEYWELL DPS8/ COBOL/IDS/DMIV**

We offer a career opportunity with an excellent salary, comprehensive benefit packages, paid overtime, and other incentives to qualified candidates.

We invite you to call Jenn Harenza at 1-800-328-9929 or send resume to:

Analysts International Corporation
7615 Metro Blvd.
Minneapolis, MN 55435
Equal Opportunity Employer

BROADWAY & SEYMOUR, INC., a nationally recognized Charlotte, N.C. based software consulting company, has openings for **PROGRAMMER ANALYSTS** in the following areas:

- **Data General COBOL**
- **DEC VAX COBOL FMS**
- **IBM CICS**
- **NOMAD**

If you have 2+ years of actual experience in any of the above skills, please send your resume to:

Fred Brillante
BROADWAY & SEYMOUR, INC.
302 S. Tryon Street
Charlotte, N.C. 28202
(704) 375-4700
An Equal Opportunity Employer M/F

MANAGERS/ SR. MANAGERS- AEROSPACE MFG.

Prominent consulting organization needs strong knowledge of systems applications in the manufacturing/aerospace industry. Must have strong Analyst background or current management responsibilities. Will head a group of development consultants. B.S. required, M.B.A. a big plus. Great benefits. Salary to the high $40's.

ROBERT HALF
Data Processing
7733 Forsyth Blvd.
St. Louis, MO 63105
314-727-1535

PROGRAMMER/ANALYST Development and support of computer software. Duties include design, programming, software enhancement, quality control and documentation. Must have in-depth working knowledge of PL/I, SAS, ISPF dialogue management services, JCL, EXEC, VM/CMS, MVS/TSO, and VAX/VMS. B.S. in Computer Science plus 2 years as Programmer/Analyst. M.S. in Computer Science may substitute experience. 40 hrs/wk, 8:30 a.m. - 5:30 p.m., Monday thru Friday. Salary: $24,500/yr. Send resume and transcripts to: Job Service of Florida, 1307 N. Monroe St., Tallahassee, FL 32302. Reference: Job Order #FL-5649642. EOE.

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California corporation and a systems management company, now developing innovative multi-technology systems in Saudi Arabia, has the following challenging position:

Systems Analyst

BS in Computer Science or related field required. Responsible for the analysis, design, testing and implementation of computerized business and financial applications.

Requires at least 5 years systems analysis experience on medium and large scale projects. Experience in the tools and techniques of structured analysis and design is essential. Must have good written and verbal communication skills. Previous experience with STRADIS, DATAMANAGER, TSO/ISPF and DFDdraw is preferred.

Please send resume with present salary to Personnel, SADC Project, Dept. CW-9/21, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. Principals only apply.

SYSOREX
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BIDS & PROPOSALS

NOTICE OF PUBLIC SALE OF COLLATERAL PURSUANT TO SECTION 9-504 OF THE ILLINOIS COMMERCIAL CODE

Pursuant to the Illinois Uniform Commercial Code, and the terms of agreements between Business Computer Systems, Inc. (debtor) and MDS Cantel, Inc. (secured party) dated February 28, 1986 and March 20, 1985, MDS Cantel will sell all property of Business Computer Systems, in which it holds a collateral security interest, at public auction at the offices of Barack, Ferrazzano, Kirschbaum & Perlman, 333 West Wacker Drive, Chicago, Illinois on September 25, 1987 at 10:00 a.m. Such collateral consists of:

Any and all rights (including, without limitation, exclusive rights) to end-users of Business Computer Systems, Inc. as defined in the VAD Agreement dated March 18,1986 by and between MDS Cantel, Inc. and Business Computer Systems, and rights to Customers of Business Computer Systems as defined in the Dealer Agreement dated March 20, 1985 by and between MDS Cantel and Business Computer Systems, including all accounts receivable, all data and documents maintained or controlled by Business Computer Systems relating thereto, Customer lists, and end-user lists, prospect lists, sales and advertising literature and materials, correspondence and other materials and information relating to Customers, end-users and prospects, documents which permit access to applications software programs of Customers and end-users and the specifications and current source code and source documentation relating thereto for use in providing Customer and end-user software support only, and any other documentation of a similar nature.

The sale will be subject to the following restrictions:

1. The above-described property will be sold to the highest bidder. There will be required a 25% deposit with each bid, with the balance of the bid price to be paid no later then the second (2nd) day after acceptance of any bid. All funds shall be paid in cash, certified check or cashier's checks payable to the order of MDS Cantel. MDS Cantel reserves the right to bid at the sale without cash, certified check or cashier's check deposit as required for other bidders. MDS Cantel reserves the right within twenty four (24) hours after the completion of bidding to reject all bids.

2. If the successful bidder defaults on the balance, bidder's initial deposit shall be forfeited to MDS Cantel, and MDS Cantel may sell to the next highest bidder.

3. The debtor has the right to redeem the collateral at any time up to the time the sale is held by tendering monies sufficient to satisfy all of its obligations due MDS Cantel.

4. MDS Cantel reserves the right to and intends to seek and enforce judgments against the debtor and guarantors for any deficiency remaining due on the underlying indebtedness after the public sale.

To the best knowledge of MDS Cantel, Business Computer Systems, Inc. has been engaged in the business of selling MDS Cantel hardware and providing software and support service for that hardware to commercial and industrial end-users in the United States. MDS Cantel has limited information regarding the business of Business Computer Systems, Inc. which it cannot and does not warrant to be accurate, current or complete. To gain access to such information, contact Mr. Ray Larson (312) 954-2252. Parties planning to attend the public sale are encouraged to notify Mr. Mark Weinberg at the offices of Barack, Ferrazzano, Kirschbaum & Perlman, attorneys for MDS Cantel at (312) 781-6900.

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE is hereby given that the Metropolitan Transportation Authority will receive proposals for the licensing by it of the software indicated below. Proposals submitted shall include Vendor Qualifications, and Technical and Price proposals. An oral presentation and product demonstration may also be required. The product will be selected using the following selection criteria:

1. Level of menu driven and user friendly features and capabilities as defined in the product specification;
2. The number of standard reports that meets MTA's needs and requirements;
3. The experience of the firm and proposed individuals relating to similar conversions;
4. The product's ability to provide end user adhoc reporting;
5. The quality and comprehensiveness of software documents (i.e. Operating Manual), product support and product training;
6. Product's ability to operate with MTA's present hardware and software without procuring third party additional hardware or software;
7. Total cost of the system. This shall include the cost for any new hardware and software which MTA would be required to purchase or license from other suppliers for the proposed product to function in accordance with the attached product specification;
8. The proposal's responsiveness to the Request for Proposal.

Proposals must comply with the Authority's Contract Documents. The Authority, at its option, may enter into negotiations with one or more proposers it selects as provided for in the Information for Proposers section of the Contract Documents. Copies of such Documents may be secured from B. DeBois, Deputy Director of Procurement Services, Metropolitan Transportation Authority, 347 Madison Avenue, New York, NY 10017.

INQUIRY NO. 8-01-24702-0 DATE Oct. 9/87
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For additional information contact Mr. Q.W. Stanton at (412) 237-3063 by September 25, 1987.

Sealed bids are due on October 9, 1987.

REQUEST FOR PROPOSALS

The City of Warwick is soliciting proposals for two mid-range computer systems and applications software. One system will support Computer Aided Dispatch and Police Records. The other system will support municipal finance and administration. Proposals are due 11 A.M., Friday, October 16, 1987. For information write or call

The City of Warwick/MIS Division
3275 Post Road
Warwick, RI 02886-7191
(401) 738-2000 x329

VAX 8650 SOFTWARE
Integrated Management System

Eugene, Oregon School District 4J solicits proposals for a complete on-line integrated management system to serve the Eugene School District which includes, at least, the functional areas of budget, personnel, finance, and purchasing. The proposed system must be VAX 8650/VMS compatible. To be considered, a proposed system must be demonstrable and be fully implemented in a school district. For a copy of the RFP contact Dr. Dale Reed, Purchasing and Central Services Manager, 200 North Monroe, Eugene, OR 97402, phone (503) 687-3461. Please refer technical inquiries to Terry Hippenhammer, Director of Computer and Information Services, (503) 687-3329. RFP's are due on or before 2:00 p.m., October 20, 1987.

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The State of Alaska is considering upgrade or replacement of its payroll system. A software search is underway to identify qualifying package software. To qualify software must be operating in a government environment utilizing ADABAS database management system. Qualified vendors should contact the Department of Administration, Division of Finance, PO Box C, MS 0204, Juneau, AK 99811 or call Keith Busch at (907) 465-2240 before November 15, 1987.

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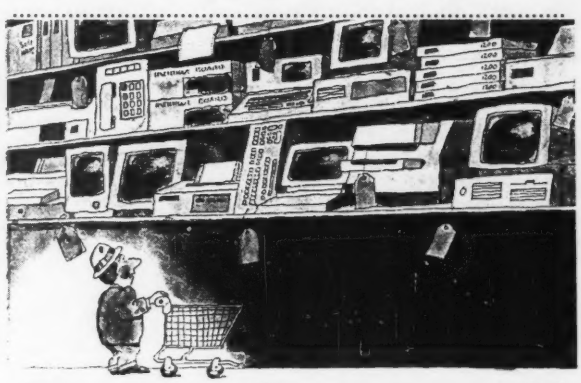

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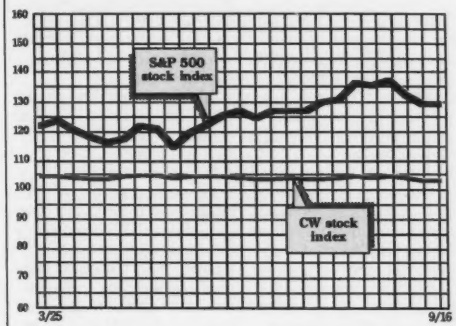

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Computer Systems	126.6	**128.0**
Software & DP Services	130.9	**133.5**
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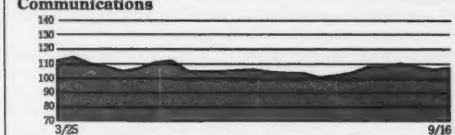
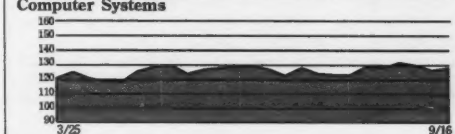
Communications

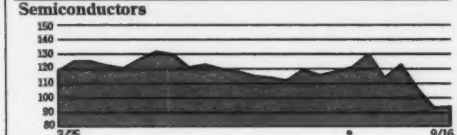


Computer Systems

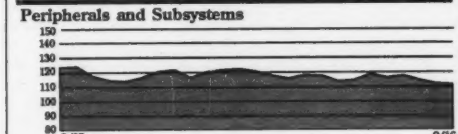


Software and DP Services

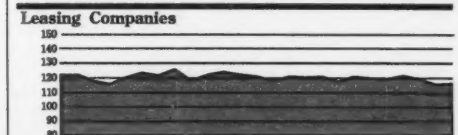
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPT. 16, 1987

EXCH		52-WEEK RANGE (1)		PRICE CLOSE SEPT. 16 1987	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	100	77	94.25	+1.1	+1.2
Q	ANDREW CORP	19	14	16.00	+1.0	+6.7
Q	ARTEL COMM CORP	5	2	2.88	+0.3	+9.5
N	AT&T	36	22	31.63	-0.6	-1.9
Q	AVANT GARDE COMP INC	7	3	4.75	-0.5	-9.5
Q	AVANTEK INC	19	13	15.75	+1.5	+10.5
N	AYDIN CORP	38	18	32.25	+0.1	+0.4
N	BELL ATLANTIC CORP	77	62	74.63	+0.8	+1.0
N	BELLSOUTH CORP	44	35	39.63	+0.0	+0.0
Q	BRIDGE COMMUNICATION	29	11	27.88	+1.4	+5.2
Q	COMPRESSION LABS INC	10	4	5.38	-0.1	-2.3
O	COMPUTER NETWORK TECH	6	3	3.00	-0.1	-4.0
O	CONTEL CORP	40	27	36.25	+0.4	+1.0
Q	DATA SWITCH CORP	9	5	7.00	-0.1	-1.8
Q	DIGITAL COMM ASSOC	49	19	42.25	+1.0	+2.4
Q	DYNATECH CORP	44	27	30.00	-0.3	-0.8
Q	EQUATORIAL COMM CO	5	2	3.13	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	5	6.88	+0.4	+5.8
Q	GENERAL DATACOMM INDS	14	8	7.63	+0.0	+0.0
N	GTE CORP	45	34	40.38	-0.8	-1.8
Q	INFOTRON SYS CORP	12	7	9.00	+0.3	+2.9
N	ITT CORP	66	47	60.75	-1.1	-1.8
Q	M/A COM INC	16	12	14.88	-0.1	-0.8
Q	MCI COMMUNICATIONS CORP	10	5	9.25	+0.5	+5.7
Q	MICOM SYS INC	16	10	11.75	-0.3	-2.1
Q	NETWORK SYS CORP	19	9	10.00	+0.0	+0.0
N	NORTHERN TELECOM LTD	24	14	22.00	+0.1	+0.6
Q	NOVELL INC	27	10	24.00	+0.8	+3.2
N	NYNEX CORP	77	59	73.63	+1.8	+2.4
N	PACIFIC TELESIS GROUP	32	23	29.00	+0.3	+0.9
N	PARADYNE CORP	9	4	7.13	-0.1	-1.7
A	PENRIL CORP	6	4	4.25	-0.4	-8.1
N	PLESSEY PLC	41	24	32.50	+1.7	+5.5
N	SCIENTIFIC ATLANTA INC	20	9	17.13	-0.5	-2.8
N	SOUTHWESTERN BELL CORP	42	33	39.13	-0.1	-0.3
Q	3 COM CORP	24	9	20.00	+0.8	+3.9
N	TIMEPLEX INC	41	15	28.25	+1.4	+5.1
Q	UNGERMANN BASS INC	16	7	9.00	-0.3	-2.7
N	U S WEST INC	59	45	54.63	-0.1	-0.2
	Computer Systems					
Q	ALLIANT COMPUTER SYS	37	15	16.50	-0.5	-2.9
Q	ALPHA MICROSYSTEMS	7	3	4.88	+0.0	+0.0
Q	ALTOS COMPUTER SYS	17	10	13.88	+1.6	+13.3
A	AMDAHL CORP	45	19	42.50	+1.9	+4.6
Q	APOLLO COMPUTER INC	25	11	20.13	+0.0	+0.0
Q	APPLE COMPUTER INC	56	16	51.75	-1.0	-1.9
N	BOLT BERANEK & NEWMAN	30	19	20.50	-0.5	-2.4
Q	BRITTON LEE INC	5	3	3.81	+0.3	+8.9
N	COMPAQ COMPUTER CORP	61	14	57.50	+0.8	+1.3
Q	COMPUTER AUTOMATION INC	17	2	12.50	-1.5	-10.7
A	COMPUTER CONSOLES INC	12	4	5.50	-0.4	-6.4
Q	CONCURRENT COMP CORP	24	13	19.50	-0.5	-2.5
N	CONTROL DATA CORP DEL	37	24	34.00	+0.5	+1.5
Q	CONVERGENT TECH	12	4	7.38	+0.3	+3.5
Q	CONVEX COMPUTER CORP	22	8	14.38	-0.1	-0.9
N	CRAY RESH INC	136	69	96.50	-0.1	-0.1
Q	DAISY SYS CORP	13	7	7.38	+0.4	+5.4
N	DATA GEN CORP	38	25	30.50	-0.4	-1.2
N	DATAPOINT CORP	9	4	7.75	-0.4	-4.8
N	DIGITAL EQUIP CORP	198	89	186.88	+4.9	+2.7
N	FLOATING POINT SYS INC	17	8	9.13	+0.0	+0.0
N	GOULD INC	25	16	23.13	+1.5	+6.9
N	HARRIS CORP	43	28	39.25	+2.3	+6.1
N	HEWLETT PACKARD CO	69	37	63.75	-0.3	-0.4
N	HONEYWELL INC	91	58	80.75	-3.5	-4.2
N	IBM	176	116	156.63	-0.6	-0.4
Q	INFORMATION INTL INC	17	13	13.00	+0.3	+2.0
Q	IPL SYS INC	3	2	2.94	-0.1	-2.1
Q	MASS COMPUTER CORP	12	5	11.50	+1.0	+9.5
N	MATSUSHITA ELEC INDL LTD	179	93	179.25	+9.3	+5.4
Q	MEGADATA CORP	7	2	6.00	+0.5	+9.1
Q	MENTOR GRAPHICS CORP	37	13	34.13	-0.4	-1.1
N	NBI INC	14	8	10.88	-0.5	-4.4
N	NCR CORP	87	42	79.13	-1.4	-1.7
N	PRIME COMPUTER INC	31	16	26.88	+0.8	+2.9
Q	PYRAMID TECHNOLOGY	12	4	8.63	+0.9	+11.3
Q	STRATUS COMPUTER	41	18	28.25	-0.5	-1.7
Q	SUN MICROSYSTEM INC	46	13	35.63	-1.8	-4.7
Q	SYMBOLICS INC	7	4	4.00	-0.3	-5.9
N	TANDEM COMPUTERS INC	38	17	30.13	+0.4	+1.3
N	TANDY CORP	56	31	47.63	+1.8	+3.8
N	ULTIMATE CORP	33	13	30.88	+0.9	+2.9
N	UNISYS CORP	48	23	43.50	+2.0	+4.8
A	WANG LABS INC	19	11	17.63	+0.1	+0.7
	Software & DP Services					
Q	ADVANCED COMP TECH	5	3	3.81	+0.2	+5.2
N	ADVANCED SYS INC	29	12	27.50	-0.3	-0.9
N	AGS COMPUTERS INC	22	8	21.25	+1.8	+9.0
Q	AMERICAN MGMT SYS INC	19	7	17.00	-0.4	-2.2
Q	AMERICAN SOFTWARE INC	22	8	13.13	+0.5	+4.0
N	ANACOMP INC	11	3	9.63	+0.5	+5.5
Q	ANALYSTS INTL CORP	9	3	7.75	+0.0	+0.0
Q	ASHTON TATE	30	12	24.00	-0.3	-1.0
Q	ASK COMPUTER SYS INC	17	10	13.38	-0.6	-4.5
N	AUTODESK INC	34	10	28.75	+1.8	+6.5
N	AUTO DATA PROCESSING	56	30	49.25	+0.0	+0.0
Q	BOOLE & BABBAGE INC	12	4	10.25	+0.3	+2.5
N	COMPUTER ASSOC INTL INC	33	11	32.00	+1.8	+5.8
Q	COMPUTER HORIZONS CORP	15	10	11.50	+0.3	+2.2
N	COMPUTER SCIENCES CORP	66	30	58.38	-0.4	-0.6
N	COMPUTER TASK GROUP INC	16	11	14.38	+1.0	+7.5
Q	COMSHARE INC	28	11	24.00	+1.0	+4.3
N	CULLINET SOFTWARE INC	14	6	12.75	-0.1	-1.0
Q	CYCARE SYS INC	11	7	9.50	+0.3	+2.7
Q	DUQUESNE SYS INC	33	13	15.50	-0.8	-4.6
Q	ENDATA INC	16	5	15.38	+1.5	+10.8
N	GENERAL MTRS (CLS E)	49	24	47.75	+1.8	+3.8
Q	HOGAN SYS INC	17	6	7.63	-0.4	-5.0
Q	INFORMIX CORP	23	7	22.25	+0.5	+2.3
Q	INTELLICORP INC	11	4	7.00	-0.1	-1.8
Q	KEANE INC	10	5	8.13	+0.6	+8.3
Q	LOTUS DEV CORP	37	12	30.00	+1.3	+4.3
Q	MANAGEMENT SCI AMER	21	11	12.25	-0.8	-5.8
Q	MICRO PRO INTL CORP	8	2	6.19	+0.9	+16.5
N	MICROSOFT CORP	128	28	116.75	+4.0	+3.5
Q	NATIONAL DATA CORP	34	17	32.63	+0.9	+2.8
Q	ON LINE SOFTWARE INTL INC	22	6	19.63	-0.4	-1.9
Q	ORACLE SYS CORP	30	7	27.50	+2.1	+8.4
N	PANSOPHIC SYS INC	23	12	20.88	-0.1	-0.6
Q	POLICY MGMT SYS CORP	30	15	24.25	+1.3	+5.4
Q	PROGRAMMING & SYS INC	13	8	12.25	-0.5	-3.9
Q	REYNOLDS & REYNOLDS CO	39	27	33.75	+0.0	+0.0
Q	SEI CORP	18	8	16.50	+0.5	+3.1
Q	SHARED MED SYS CORP	53	23	25.63	-1.0	-3.8
Q	SOFTWARE AG SYSTEMS INC	19	10	12.25	-0.4	-3.0
Q	SOFTWARE PUBG CORP	17	5	9.25	-0.3	-2.6
A	STERLING SOFTWARE INC	16	9	8.75	-0.3	-2.8
Q	SUNGARD DATA SYS INC	21	10	17.00	+0.0	+0.0
Q	SYSTEMATICS INC	30	14	27.38	+1.1	+4.3
N	URS CORP	22	13	22.13	+3.0	+15.7
Q	VM SOFTWARE INC	45	15	15.75	-0.5	-3.1
	Semiconductors					
N	ADV MICRO DEVICES INC	25	13	20.88	+0.8	+3.7
N	ANALOG DEVICES INC	24	14	19.25	-0.1	-0.6
Q	ANALOGIC CORP	13	10	12.00	+0.0	+0.0
Q	INTEL CORP	56	18	54.00	+0.9	+1.6
Q	LSI LOGIC CORP	17	8	12.75	+0.1	+1.0
N	MOTOROLA INC	72	34	65.00	+0.8	+1.2
N	NATL SEMICONDUCTOR	18	8	17.00	+0.5	+3.0
N	TEXAS INSTRS INC	78	35	71.88	+1.9	+2.7
A	WESTERN DIGITAL CORP	33	13	23.00	-0.9	-3.7
	Peripherals					
N	AM INTL INC	9	5	7.50	+0.3	+3.4
Q	AST RESH INC	23	11	18.38	+2.0	+11.9
Q	AUTO TROL TECH CORP	9	3	5.94	+0.1	+1.1
Q	BANCTEC INC	16	7	12.25	+0.8	+6.5
Q	CIPHER DATA PRODS INC	18	9	11.50	+0.6	+5.7
A	COGNITRONICS CORP	5	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	26	18	25.50	+0.3	+1.0
N	COMPUTERVISION CORP	23	13	14.38	+0.1	+0.9
A	DATAPRODUCTS CORP	16	10	11.25	+0.1	+1.1
A	DATARAM CORP	9	7	7.63	+0.4	+5.2
N	DECISION INDS CORP	13	7	11.00	+0.0	+0.0
N	EASTMAN KODAK CO	104	52	99.00	+0.6	+0.6
Q	E M C CORP MASS	29	7	25.75	+1.5	+6.2
Q	EMULEX CORP	10	6	6.88	-0.6	-8.3
Q	EVANS & SUTHERLAND	40	21	27.50	-2.8	-9.1
Q	ICOT CORP	13	5	6.13	+0.1	+2.1
Q	INTERLEAF INC	20	8	18.88	+1.1	+6.3
Q	IOMEGA CORP	10	2	2.88	+0.0	+0.0
Q	LEE DATA CORP	10	5	5.63	+0.0	+0.0
Q	MASSTOR SYS CORP	6	3	3.88	-0.5	-11.4
Q	MAXTOR CORP	34	10	11.88	+0.4	+3.3
Q	MICROPOLIS CORP	44	14	29.25	-4.6	-13.7
Q	MINISCRIBE CORP	18	6	13.88	+0.9	+6.7
N	MINNESOTA MNG & MFG CO	84	50	75.75	+0.4	+0.5
A	MSI DATA CORP	24	10	22.50	+2.0	+9.8
Q	PRIAM CORP	6	2	2.75	-0.3	-8.3
Q	PRINTRONIX INC	14	10	11.38	+0.4	+3.4
N	QMS INC	26	11	25.00	+3.1	+14.3
Q	QUANTUM CORP	35	15	17.25	+0.3	+1.5
Q	RAMTEK CORP	6	4	5.00	-0.3	-4.8
N	RECOGNITION EQUIP INC	27	12	16.50	-0.3	-1.5
Q	REXON INC	14	5	8.00	-0.3	-3.0
Q	SCAN TRON CORP	17	11	12.75	+1.0	+8.5
Q	SEAGATE TECHNOLOGY	46	13	22.00	-6.6	-23.1
N	STORAGE TECH CORP	5	2	3.00	+0.1	+4.3
Q	TANDON CORP	7	2	3.00	-0.5	-14.3
A	TEC INC	7	3	4.63	+0.0	+0.0
N	TEKTRONIX INC	43	30	35.50	-2.1	-5.6
Q	TELEVIDEO SYS INC	3	2	2.94	+0.0	+0.0
N	TELEX CORP	102	51	51.38	-16.1	-23.9
Q	WYSE TECH	36	13	33.88	+1.6	+5.0
N	XEROX CORP	85	51	78.50	+2.5	+3.3
Q	XIDEX CORP	17	11	11.25	-0.1	-1.1
	Leasing Companies					
N	COMDISCO INC	35	15	32.50	+1.5	+4.8
N	CONTINENTAL INFO SYS	14	7	10.00	-0.3	-2.4
Q	PHOENIX AMERN INC	8	3	4.50	-0.1	-2.7
Q	SELECTERM INC	7	5	5.13	+0.1	+2.5
N	U S LEASING INTL	55	40	48.50	+0.5	+1.0

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Is it terminal?

Low-end competition from HP crushes Telex in down week

It was a down week for the stock market, but few companies suffered as badly as Tulsa, Okla.-based terminal maker Telex Corp.

Following Monday's announcement that its second-quarter earnings would be some 33% lower than projected, Telex stock plunged 13½ points to 51⅞. Monday's massive sell-off moderated during the next three days, and Telex closed Thursday at 51.

Telex reduced its quarterly earnings estimate from $21.9 million, or $1.50 per share, to $14.6 million, or $1 a share. Analysts attributed the reduction to the firm's unanticipated low-price competition from Hewlett-Packard Co., which introduced the $695 HP-700/71 terminal for IBM systems in August. Estimates for the quarter ending Sept. 30 are also well below the year-earlier quarter.

Intel Corp., which has ridden the technology stock rally of recent months nicely, announced a 3-for-2 stock split Thursday, with the effective date to be determined. Intel rose a quarter of a point Thursday to 54¼; it has traded as low as 18 within the past year.

Computer Associates International, Inc. continued its recent strength, rising 1¼ points Thursday to a new high of 33¼.

CLINTON WILDER

Amdahl unaffected by partner Fujitsu's gains

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp.'s effort to develop an IBM MVS-like operating system is unlikely to be affected by the settlement of a software copyright dispute between IBM and Fujistu Ltd., the latter of which owns 49% of Amdahl, industry sources said.

Amdahl's Aspen project is believed to be an MVS-like operating system for on-line transaction processing and has been under development for several years. Last week's settlement of the conflict theoretically frees Fujitsu to launch an Aspen-like effort of its own.

The possibility that Fujitsu might develop such an operating system on its own triggered speculation last week that the Fujitsu-IBM accord might render Amdahl's project redundant by permitting the Japanese company to develop and sell proprietary systems software directly to the U.S. market.

But a knowledgeable source, who requested anonymity, discounted such theorizing.

"Fujitsu has never shown any interest in involving itself in Aspen," he said. "In fact, they're terrified that IBM would claim the results of the Aspen project as its own intellectual property."

Aspen, whose existence Amdahl acknowledged nearly four years ago, constitutes an Amdahl-directed effort to develop value-added systems software for on-line transaction processing. But "value-added software on both the application and systems sides has historically been a Japanese weakness," said Jeff Canin, an investment analyst with Hambrecht & Quist, Inc.

Nothing in last week's agreement with IBM is likely to prompt the Tokyo-based company to reconsider its role, Canin said.

Nor will Fujitsu likely view the accord as an opportunity to turn its American business partner into a U.S. outlet for Japanese operating systems. Because Amdahl's software efforts focus primarily on adding value, "I think the two companies would have very little interest" in entering into that kind of arrangement, Canin said. Instead, Amdahl users will continue to license their control programs directly from IBM, he said.

Because "Aspen is not a direct replacement for MVS/XA, it won't be affected by the agreement between IBM and Fujitsu," an Amdahl spokesman said.

Arbitration way of future?

Arbitration is the most formal and binding procedure in alternative dispute resolution and an increasingly popular method of reaching legal agreements. Arbitration may prove to be the wave of the future in settling computer vendor disputes for several reasons:

- Once the participants have agreed to submit to the arbitrators' decision, it is legally binding and cannot be appealed or otherwise challenged for the duration of the settlement. IBM will save an estimated $30 million or more by submitting to arbitration rather than fighting Fujitsu Ltd. in court, according to John R. Logan, an analyst with The Yankee Group in Boston and a consultant to IBM at the time it fought off a dozen antitrust lawsuits in the 1970s.
- It settles disputes much faster than the courts can, a key advantage in an industry in which the time to market is a critical success factor.
- Arbitration decisions are not bound by the traditional legal constraints of existing statutory or case law.
- The arbitration process — hearings, written and oral testimony and cross-examination of witnesses — is completely private. In most cases, the arbitrators' final decision and award is not made public. Because of the size and significance of the IBM-Fujitsu settlement, the arbitrators chose to make it public but prohibited the companies from commenting beyond the brief statements released last week.

CLINTON WILDER
and CHARLES BABCOCK

Amdahl beefs up front end with ECL performance jolt

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp. last week countered IBM's 3725 communications processor with the long-expected introduction of two front ends that it said use emitter-coupled logic (ECL) to provide 20% to 80% better performance than Amdahl's previous offerings.

By incorporating 20,000-gate-per-chip CMOS technology, the 4725 Models 30 and 40 also boast 40% to 50% higher reliability than Amdahl's existing 4705E network controller, according to Tim Logan, Amdahl's communications product director.

With the 4725 models all configuration variables are defined or redefined in microcode — an approach that spares customers from having to buy options, Logan said.

'Ahead of game'

While Amdahl emphasized the 4725 front ends' reliability, Bill McMinn, voice and data communications manager for Dallas-based Southland Corp., a major Amdahl account, cited the improved performance as the key feature. "From my standpoint, the chief advantage of the two products seems to be their capacity and throughput," McMinn said. "If you can replace five or six 4705s with three or four 4725s, you're that much ahead of the game."

In the 4725 front ends, ECL chips boast a 30-nsec machine cycle, compared with 200 nsec on their IBM counterpart, the 3725, according to Amdahl communications product manager, William Caroli.

The 4725 models' improved reliability, meanwhile, stems from their heavy dependence on CMOS circuitry, a high-density technology that minimizes parts counts and thus eliminates many potential sources of hardware failure, Caroli said. Use of CMOS has enabled Amdahl to squeeze a line-attachment base (LAB) that formerly required 32 boards onto one and reduce the product footprints by 30% compared to the earlier model.

Moreover, the Amdahl network controllers support up to 64 lines operating at 64K bit/sec. and use a 26M bit/sec. bus as opposed to 7M bit/sec. for the IBM machine, Logan said.

Expandable to 3M bytes of main memory, the 4725 front ends support up to 256 half- or full-duplex lines ranging in speed from 50K to 256K bit/sec. The machines come with a 20M-byte hard disk to receive downloaded NCP code and can be remotely troubleshot from Amdahl's diagnostics assistance center.

A minimally configured Model 30, which can be upgraded in the field to a Model 40, combines 512K bytes of main memory with two LABs. It costs $71,500.

At the other end of the 4725 price scale, a Model 40 with 3M bytes of internal storage, eight LABs, six channel adapters and 64 lines sells for $545,160. Deliveries of the larger Amdahl front end start immediately with shipments of the entry-level versions set for 1988.

'Never mind'

FROM PAGE 1

time-consuming than the benefits you get."

Two years ago, many Fortune 1,000 firms were pressuring microcomputer software vendors for the freedom to copy and distribute software for a fixed price. While many smaller vendors relented in hopes of quickly gaining market share, the Big Three have stood their ground. Now, users say administrative overhead has made site licensing much less attractive.

Overhead is only one of a raft of problems that have prevented the idea from taking hold. The difficulty that MIS managers have in convincing management to commit a large up-front sum to a small microcomputer vendor, the lack of a plan from Lotus, Microsoft or Ashton-Tate and the usual legal entanglements have all blocked the concept's momentum.

Upper management in Fortune 1,000 companies remains skeptical about signing site licenses with small companies because it feels it would lose its investment if the company went out of business. While a few small developers have signed deals with major corporate accounts, it usually takes a considerable leap of faith by both parties for a deal to be signed.

"There is a basic problem that has to do with commitment vs. discount, and they [software vendors and corporations] can't seem to meet in the middle," says Dave Smoot, chairman and chief executive officer of Software Funding International in Deerfield, Ill.

Software Funding offers one solution to the problem by making the up-front payment to the vendor on behalf of the corporation, which pays back the loan over a period of time.

"If someone buys 1,000 copies, it takes months to install and educate people, so their payback is somewhat aborted," Smoot says. Software Funding has negotiated $4 million worth of site-licensing agreements with Fortune 1,000 firms since February, he says.

While Software Funding might help small to medium-size companies, several Fortune 1,000 firms interviewed said the loan approach would not help them much, since they are already well-funded and have sophisticated MIS departments.

Many large corporate accounts say they would be interested largely in site licenses with the Big Three. "For us to make a big up-front payment, it would have to be a viable company, like a Microsoft or an Ashton-Tate. With smaller companies, it's very hard for us to convince management," says B. J. Garnett, manager of Hughes Aircraft Co.'s management systems department.

If site licensing were to fade away, many second-tier companies say they would be at an even bigger disadvantage to the Big Three.

"It would be a shame for the second tier, because the end-user community wouldn't realize there is a hell of a lot of good software out there other than [that from] the top 10," Smoot says.

Long legal process

Another stumbling block to site licensing is the lengthy legal process that precedes such agreements.

"What happens is the paperwork and legal aspects are such long procedures that, in the meantime, these companies start buying on a volume-purchase agreement basis," says Richard Rabins, president of Alpha Software Corp. in Burlington, Mass.

Few companies have signed site licenses with small software vendors. General Electric Co. has signed unlimited site licenses with several software companies, including Alpha Software, Office Solutions, Inc. and Computer Associates International, Inc.

Besides saving money, GE signed the agreements to hasten the creation of standards within the company, according to Jeff Ehrlich, manager of product technology for GE Corporate Information Technology in Bridgeport, Conn.

"I don't know why more companies haven't signed them. It has been really effective for us," Ehrlich says.

One option that interests some large user organizations is a license that allows them to download copies of micro programs from mainframes. So far, only Lotus has beta-tested such an approach (with Exxon Corp.), but it has yet to announce an agreement.

Electronic distribution "is the direction we are heading in," says Jim Morison, manager of end-user computing at Douglas Aircraft Co. "Now, we are individually installing software and want to get away from that."

Most software companies say they do not think this trend will become a reality for quite some time. However, Ansa Software is exploring the possibility and currently beta-testing the idea with universities. According to Ansa President Ron Posner, most large universities are better set up for downloading software from mainframes than are many corporations.

Fujitsu

FROM PAGE 1

Nonetheless, most industry observers and MIS executives interviewed were skeptical about the prospects for true competition in IBM mainframe operating systems, particularly in the U.S.

"Fujitsu got the sleeves of the vest — not the whole thing," said Rick J. Martin, a former IBM employee now following the company for Sanford C. Bernstein & Co. "They don't get the use of IBM's code, just the chance to look at it. In the long run, I don't think the balance of power has shifted at all."

The huge upheaval of converting a mainframe operating system will remain a formidable market obstacle for Fujitsu.

Fujitsu will also gain access to 55 IBM manuals, including yet-to-be-published documentation on Systems Application Architecture and Systems Integration Architecture.

It is significant, however, that Fujitsu will have no access to microcode. That factor could accelerate IBM's effort to embed more operating systems source code in hardware.

IBM has been retracting customer source code access during the past two years, according to Martin Goetz, senior vice-president of technology at Applied Data Research, Inc. and chairman of the IBM Interface Committee of ADAPSO. Customers do not get source code with newer products like DB2 and are gradually losing access to code for existing products.

The arbitration process began in July 1985, when the two companies agreed to submit to binding arbitration to resolve IBM's charge that Fujitsu was violating terms of several agreements reached in 1983. Under those agreements, Fujitsu made semiannual payments in exchange for IBM's sharing of software interface information.

But the pacts quickly collapsed in a spate of bitter charges and disagreements regarding "ill-defined" concepts, AAA's Jones said. Among other allegations, IBM charged that Fujitsu's OSIV/F4 MSP contained trade secrets from MVS/XA and that Fujitsu was not paying IBM the agreed-upon percentages of Fujitsu's operating system license fees.

Observers likened the effect of the arbitration settlement to that of IBM's 1983 agreement with the world's other leading maker of IBM plug-compatible mainframes, Hitachi Ltd. Hitachi has paid IBM a rumored $300 million fee to license mainframe operating systems.

Yashuhi Sayama, deputy general manager of Hitachi America Ltd. in Tarrytown, N.Y., said his company does not know the details of Fujitsu's negotiations but that he believes the outcome is similar to the Hitachi settlement. "We feel that customers of both Fujitsu and Hitachi won't have to worry about the future of the IBM-compatible business," he said. "Now, we and Fujitsu can start a new round of competition on equal terms."

Since Fujitsu does not currently sell its products directly in the U.S. because of its agreement with Amdahl Corp., the settlement's biggest short-term effect will be in the European and Asian markets. Fujitsu has been significantly hindered by user and OEM customer concerns about the threat of IBM litigation.

Most significantly, Siemens AG, Fujitsu's OEM channel in West Germany, decided in 1986 not to market the operating system at the heart of the IBM dispute.

Sources said the development of the IBM-compatible Aspen operating system by Amdahl, a firm in which Fujitsu owns almost half the stock, would probably not be affected by the IBM-Fujitsu arrangement (see story page 148).

An often overlooked aspect of the settlement is that IBM will be allowed to license Fujitsu operating systems. That may give IBM Japan Ltd. more leverage in penetrating Fujitsu accounts in Japan, Bernstein's Martin said. In its market share battle with Fujitsu and Hitachi, IBM Japan has begun selling its 3090s through OEM agreements with Toshiba Corp., Mitsubishi Corp. and Oki Electric Industry Co.

But Japanese sources said there are difficulties with IBM and Fujitsu cross-licensing each other's operating systems, at least for the near term. An IBM Japan spokesman said Fujitsu programs could not run on IBM mainframes without modification. Also, many of the IBM programs are based on English-language software but rewritten, using the same coding, in Japanese Kanji ideographs.

A Fujitsu spokeswoman added that most Fujitsu software is in Kanji, with limited English-language system sales in Australia and Spain. She also stressed the incompatibility of the two firms' programs, noting that Fujitsu has a proprietary operating system, data base management system and Japanese processing system. During a New York press conference beamed by satellite to Tokyo, AAA's Jones and Mnookin focused on the secure facilities aspect of the order. At such facilities, Fujitsu will be allowed to examine IBM's programming information under very controlled conditions, they said.

Should Fujitsu decide that it wants a specific piece of information, the data must be written on a formal survey sheet that will be reviewed by IBM and AAA officials before it leaves the premises. Once outside, the information belongs to Fujitsu, with IBM having no grounds for complaint. Fujitsu will pay a fee for whatever information it secures.

The contents of the sheets and which parts of the massive tomes of IBM information can be removed are still under discussion.

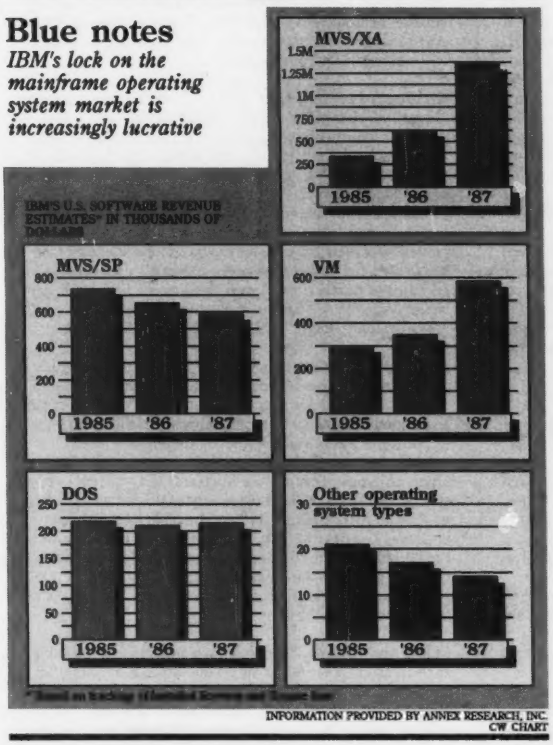
Jones, the retired executive vice-president of MIS at Norfolk Southern Corp. and past chairman of the committee that developed Cobol, said arbitration was essential to getting beyond the impasse created by IBM and Fujitsu's 1983 agreements.

To stay within the 1983 framework "would have only generated more disputes, more confusion and tremendous uncertainty for both companies and for their customers," Jones said.

Senior Editor Charles Babcock, Midwest correspondent Jean S. Bozman and IDG News Service Tokyo correspondent Lori Valigra contributed to this report.

Blue notes

IBM's lock on the mainframe operating system market is increasingly lucrative



Yawns from users

Last week's settlement between IBM and Fujitsu Ltd. may have been an unprecedented arrangement for two computer vendors, but it was met with a shrug of indifference by many mainframe shops.

"Given the fact that costs continue to go up, it would be nice to have real competition," said Daniel Leskinen, manager of information systems at Detroit Edison Co., which uses both IBM and Amdahl Corp. hardware. "But most of us have accepted where we are at."

MIS directors contacted by *Computerworld* last week said they doubt the settlement will impact their operations. While they said they would like to see serious competition in the mainframe operating systems market, they also said it is highly unlikely that they will convert to a Fujitsu offering.

User sites may eventually benefit by getting better products at lower prices from IBM, but the managers said that may take years.

"From a hardware standpoint, our mind-set changed a long time ago. We decided to get more bang for the buck," said Donald Breitenbach, vice-president of MIS at American Family Mutual Insurance Co. in Madison, Wis., which runs an Amdahl system. "But with the operating system, that would be much more difficult."

David Kearney, vice-president of MIS at Southland Corp., also said the highly critical nature of an operating system makes him leery of considering another vendor. "There certainly would be an advantage to have an alternative, because IBM has a monopoly here," Kearney said. "But at the same time, the operating system is so critical and complex that we would be very cautious."

Kearney's facility runs an Amdahl Model 5890-300 and an IBM 3090 Model 200. Like other managers, he said it will take time before Fujitsu can be considered a legitimate competitor to IBM.

One user said his IBM shop would only consider a Fujitsu operating system if it had a drastically lower price than IBM's software. "If the price was much lower, we'd take a look at it," said Robert Bone, director of data processing at Bergen Brunswig Corp., a drugs and medical supplies distribution firm.

ROSEMARY HAMILTON

Arbitrator Jones

"The few users who might be price-sensitive still have the threat of future incompatibility after the five- to 10-year time frame," said Peter Burris, a software research analyst for International Data Corp. "In the long run, IBM is still going to control the environment, not Fujitsu."

The settlement gives Fujitsu access to IBM source code for more than 750 programs, including the OS, MVS, VSE and VM operating systems, along with many system utilities and major MVS subsystems such as CICS, JES2 and JES3. Fujitsu's access, in some cases, will go beyond what IBM has so far elected to share with its large customers.

Paradox leading Borland drive

Sews up Ansa deal to begin determined push into corporate accounts

BY STEPHEN JONES
CW STAFF

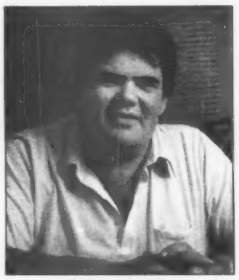
SANTA CLARA, Calif. — Borland International last week outlined its bid for a larger share of the corporate marketplace by finalizing its $30 million acquisition of Ansa Software and announcing a spate of upcoming products based on Ansa's Paradox relational data base.

New versions of Paradox will move the product line across a variety of operating environments and architectures, including Unix and IBM's OS/2, and hardware based on Intel Corp.'s 80386 microprocessor. An additional release is scheduled to include SQL capabilities that allow microcomputer users to access data stored on minicomputers and mainframes. The firm declined to give pricing for any of the upcoming products.

Like the current Ansa line, the new products are aimed directly at stealing sales from Ashton-Tate and its Dbase III Plus data base.

Borland "stands a very good chance of gaining share in the overall data base marketplace," said Brian Mutert, an analyst with Robertson, Colman & Stephens in San Francisco.

The Paradox product line is the first in a series of mainstream business programs that Borland said it will begin shipping in the next several months.



Philippe Kahn

In order to grow

"We want to grow, and when you want to grow, you have to move to different areas. For us, that means big corporations and the government," said Borland President Philippe Kahn.

The Paradox products were in the works long before Borland and Ansa started merger talks in July.

The offerings include the following:

- A program designed to run on 386-based microcomputers, which Ansa officials claimed will break the 640K-byte random-access memory barrier. The package will be released in the fourth quarter, according to Ansa Vice-President Robert Shostak.
- Unix and OS/2 operating environment versions that are expected to provide full file and application compatibility with existing Paradox products. The Unix version is set to ship in mid-1988. For the OS/2 version, the company has an ambitious plan to ship concurrently with OS/2.
- A package that will extend Paradox's graphical interface to run under Microsoft Corp.'s Windows and IBM's Presentation Manager. It is slated to be available shortly after IBM releases the Presentation Manager, expected sometime next year.
- An SQL version that company officials claimed will be able to call up a table located on an SQL-based mainframe and automatically translate the SQL table structure into the standard Paradox query format. Conceding that SQL is a difficult technology to implement, officials did not give a specific release date for the product.
- A jointly developed product that would put Borland's Turbo C and Turbo Pascal on the front end of a programming development environment in which programmers would have access to Paradox features, including querying, sorting and indexing.

Phoenix deepens accord with BIOS

NORWOOD, Mass. — Phoenix Technologies, Ltd. last week announced its next generation of BIOS compatibility, which is made up of a series of major enhancements to its IBM Personal Computer AT-compatible ROM BIOS products based on Intel Corp.'s 80386 and 80286 chips.

The 80286-based ROM BIOS Plus supports systems operating at 16 MHz with zero-wait states. A series of design recommendations that address bus timing and speed-switching will be provided to licensees, according to company spokesmen.

The 386-based ROM BIOS Plus supports 386-based systems operating at speeds of up to 25 MHz. It offers support for Intel's 80387 math coprocessor. As with the 80286 version, design recommendations that address bus timing and speed switching will be provided.

Laptop ROM BIOS Plus provides extended support for low-power consumption components and LCD logic. The product supports Intel 8086-, 80286- and 80386-based systems.

Phoenix also announced 80386 BIOS Plus, which provides full support for AT-compatible systems that are built around Chips and Technologies, Inc.'s Chipset.

Major enhancements made to Phoenix's existing product line include optimized support for the IBM and Microsoft Corp. OS/2 operating system; 3½-in., 1.44M- or 720K-byte disks; a setup program in read-only memory, or ROM; extended Microsoft Windows support; and improved speed-switching.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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INSIDE LINES

Meet me at the station. Apple is putting the finishing touches on Macworkstation, a software package that lets users hook up to a mainframe and execute host tasks without leaving the friendly confines of the Mac. Though Apple is mum on Macworkstation's features, users say it's slick and quick, retaining the Mac's interface without sacrificing much performance. There's a catch, though. Software developers have to modify their mainframe packages to work with Macworkstation. And no one's figured out yet how to represent Cullinet's IDMS/R in a bit-map icon.

Cold feet. ADAPSO and the Information Industry Association have stopped talking about a merger. Instead, the merger task force will begin today to discuss scaled-down plans for joint activities such as conferences, workshops and publications. The talks are still friendly, but "both sides realized that a merger was too far out front, and they needed to take this one step at a time," one source said.

Looking for Mr. Goodwrench. CDC's Engineering Services division said last week it has signed a contract with a maintenance subsidiary of Chicago's Comdisco, one of the largest lessors of IBM equipment. CDC will handle monthly service for Comdisco's customers, as one of several third-party maintenance providers on contract with Comdisco's Maintenance Services division.

Singing a different tune. The Codd and Date Consulting Group, which worked with ADR on Release 8 of Datacom/DB (see story page 8), will not test the relational fidelity of the release until it is delivered in full. According to E. F. Codd, some industry insiders charge that the institute evaluated vaporware when Cincom Systems made public his evaluation of its Supra data base management system — based on early documentation — in which the product passed 10 of the 12 rules of his relational model. Some of Supra's relational features, however, haven't been incorporated into the product. Codd said the current Supra release would probably not fare as well under the institute's new rating system, which includes some 150 rules and features.

Heard it through the grapevine. Banyan is expected to announce its 386-based file server today, according to users who have tested the product. The file server is expected to be positioned at the high end and reportedly will be followed by Banyan's next release of Vines in November.

Open this one. Sources say Microsoft has written a version of 386 Windows for Compaq that Compaq will bundle with its 20-MHz Deskpro 386 and Portable III scheduled to be announced next week in New York. With 386 Windows, the 20-MHz system could easily be positioned as the much-rumored graphics workstation the company has been expected to announce. It would be the first time Compaq has bundled software with its systems.

Peaks and valleys. The "software problems" often cited as the reason for the follow-on product to IBM's System/36 and 38 still being a year away were recently pinned down a little more closely. One observer said that IBM developers in Rochester, Minn., have encountered performance problems at the lower end of the processor family, code-named Silverlake. The problems now being targeted reportedly involve the challenge of integrating portions of IBM's Control Program Facility as part of a new operating system on those smaller processors. However, the source also said development has moved more smoothly at the high end, with the top Silverlake machines on target to provide 30% to 40% performance gains in comparison with the top System/38 processors.

Bring in the AUXiliary. Phoenix Technologies has developed an 8088-based coprocessor board for Apple's Macintosh II, expected to be introduced at November's Comdex/Fall '87 show. According to sources, the board allows the Mac II to run Microsoft's MS-DOS under Unix. Pricing for the board has not been determined, sources said. AUX, Apple's version of Unix originally scheduled for availability in July, has been delayed because of performance issues and is not expected until later this year.

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